UNITED STATES DEPARTMENT OF LABOR
FRANCES PERKINS, Secretary

CHILDREN'S BUREAU
GRACE ABBOTT, Chief

MATERNAL MORTALITY IN FIFTEEN STATES

◆

Bureau Publication No. 223

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1934

or sale by the Superintendent of Documents, Washington, D.C. - - - - - - - - - - - - - - - - Price 20 cents

CONTENTS

	Page
Letter of transmittal	XIII
SCOPE AND METHOD OF THE STUDY	1
GENERAL CONSIDERATIONS	5
Cause of death	5
Classification of deaths according to international list	5
Comparison of causes originally assigned and those found through interviews	7
Changes in classification within the puerperal group	8
Signature on death certificate and medical attention	11
Signature on death certificate and changes in classification of deaths	12
Autopsies	14
Deaths excluded from study because found to be nonpuerperal	15
Race and nativity	16
Deaths in urban and rural areas	19
Urban rates affected by deaths of nonresidents in hospitals	20
Accessibility and medical attention	22
Hospitalization	25
Interval between termination of pregnancy and death	27
Trimester of pregnancy	28
Live births and stillbirths	32
Parity and age	34
Illegitimacy	36
Comment by advisory committee	38
MATERNAL CARE	40
Prenatal care	40
The group for whom report as to prenatal care was received	41
Large proportion of women without prenatal care	41
Grading of the prenatal care received	43
Frequency of various elements of prenatal care	44
Grade of prenatal care, cause of death, and period of gestation	45
Prenatal care and number of pregnancies	48
Prenatal care in relation to live births and stillbirths	49
Prenatal care in the different States	50
Delivery care	55
Hospitalization at delivery	55
Attendant at confinement	56
Technique of principal physician	60
Use of pituitrin	62
Postpartum care	63
Comment by advisory committee	63
OPERATIONS	65
Operations in the last trimester	65
Operations for delivery	65
Operations other than for delivery	76
Operations in the first two trimesters	78
Laparotomy for ectopic gestation	78
Therapeutic abortions	79
Operations not for delivery on women who had no operation for delivery	80
Onset and termination of labor in the first two trimesters	80
Incidence of operative deliveries	83
Comment by advisory committee	87
CESAREAN SECTION	89
Cause of death	89
Indications for operation	89

CESAREAN SECTION—Continued. Pa

Parity and age
Duration of labor
Rupture of membranes
Planned and emergency operations
Attempts at other operations
Attendants preceding operator
Technique of operator
Live births and stillbirths
Anesthesia
Cesarean section in the individual States and among urban and rural and white and colored groups
Comment by advisory committee
Indications and choice of operation
Immediate cause of death 1
ABORTIONS 1
Definition in present study different from international list 1
Criminal abortion 1
Deaths following abortion and their causes 1
Type of abortion 1
Predominance of sepsis as a cause of deaths following abortion 1
Period of gestation 1
Operations 1
Indications for therapeutic abortions 1
Illegitimacy 1
Age of mother and type of abortion 1
Parity and type of abortion 1
Mortality from abortion among white and colored and urban and rural groups 1
Mortality from abortion in the different States 1
Comment by advisory committee 1
PUERPERAL SEPTICEMIA 1
Deaths attributed to septicemia in the group studied 1
Duration of pregnancy 1
Intrauterine manipulation 1
Operations 1
First two trimesters 1
Last trimester 1
Interval between delivery and appearance of symptoms 1
Attendant at birth 1
Nursing care 1
Technique of principal physician 1
Asepsis 1
Vaginal examinations and use of rubber gloves 1
Rectal examinations 1
Preparation of patient 1
Hospital treatment 1
Interval between delivery or abortion and death 1
Sepsis death rates among white and colored and urban and rural groups in the different States 1
Septic abortion in the different States 1
Comment by advisory committee 1
PUERPERAL PHLEGMASIA ALBA DOLENS, EMBOLUS, SUDDEN DEATH 1
Deaths attributed to embolism 1
Deaths following abortions 1
Type of delivery 1
Interval between delivery or abortion and death 1
Mortality rates in the States as related to other accidents of labor and to medical care 1
Proportion of maternal deaths and mortality rates among white and colored and urban and rural groups 1
Comment by advisory committee 1

Page
TOXEMIAS OF PREGNANCY 139
  Assignment of toxemias according to international list 139
  Puerperal albuminuria and convulsions 140
    Changes in assignment of deaths to albuminuria and convulsions 141
    Primary causes of deaths having albuminuria and convulsions as chief contributing cause 141
    Types of toxemia included 141
    Prenatal care received 142
    Cooperation of patient with physician 143
    Condition of patient when first seen by physician 144
    Bed treatment and hospitalization 145
    Onset of labor—artificial and spontaneous 146
    Termination of labor—artificial and spontaneous 147
    Operations for delivery 148
    Delivery before and after death, and convulsions 148
    Live births and stillbirths 149
    Large proportion of previous kidney disease 149
    Parity and age 149
    Prevalence of deaths from albuminuria and convulsions among white and colored and among urban and rural mothers 150
  Pernicious vomiting 151
  Comment by advisory committee 153
PUERPERAL HEMORRHAGE 155
  Parity and age 155
  Puerperal hemorrhage among urban and rural and white and colored women, by States 157
  Placenta previa 158
  Other puerperal hemorrhage 161
    Postpartum hemorrhage 162
    Premature separation of the placenta 163
  Comment by advisory committee 163
OTHER ACCIDENTS OF LABOR, INCLUDING RUPTURE OF THE UTERUS 166
  Other accidents of labor 166
  Rupture of the uterus 167
  Inversion of the uterus 169
  Comment by advisory committee 170
ECTOPIC GESTATION 172
  Deaths associated with ectopic gestation in urban and rural areas 172
  Deaths associated with ectopic gestation among white and colored women 173
  Medical attention and hospital care 173
  Parity and age 174
  Periods in which symptoms began and in which deaths occurred 175
  Operations for ectopic gestation 176
    Duration of symptoms before operation or before death 176
    Type of operation for ectopic gestation 177
  Other operations on women with ectopic gestation 177
  Viable fetuses 178
  Obstetric history of multigravidae 178
  Comment by advisory committee 178
RECOMMENDATIONS BY ADVISORY COMMITTEE 180
  To the medical profession 180
  To the general public 181
  Standards of American College of Surgeons for hospitals taking obstetric patients 182
Appendix A.—General tables 183
Appendix B.—The 1929 revision of the Manual of the International List of Causes of Death 212
Appendix C.—Schedule used in the study (facing) 216
Index 217

TEXT TABLES

Table — Page

1. Cause of death as given on the death certificate and as shown by interview, and mortality rate among women whose deaths were assigned to puerperal causes — 8
2. Classification of cause of death as given on the death certificate and as shown by interview among women whose deaths were assigned to puerperal causes — 10
3. Signature on the death certificate and medical attention among women whose deaths were assigned to puerperal causes — 11
4. Classification of cause of death as certified, signature on death certificate, and change in classification following interview for women whose deaths were assigned to puerperal causes — 13
5. Cause of death as shown by interview, and mortality rate among white and colored women dying from puerperal causes — 17
6. All live births in the State, deaths from puerperal causes, and mortality rate among native and foreign-born white women dying from puerperal causes in all the States included in the study and in specified States having 2,000 or more births to foreign-born white women in the biennium 1927–28 — 17
7. Cause of death as shown by interview, and mortality rate among women dying in urban and rural areas from puerperal causes — 19
8. Hospitalization and residence of women dying in hospitals among women dying from puerperal causes in urban and rural areas of each State included in the study — 21
9. Accessibility of physician and medical attention received by women dying from puerperal causes — 22
10. Cause of death as shown by interview and accessibility of physician among women dying from puerperal causes — 24
11. Medical attention received by women dying from puerperal causes in each State included in the study — 25
12. Hospitalization and trimester of pregnancy of white and colored women dying from puerperal causes — 26
13. Percentage of deaths from selected causes as shown by interview, according to interval between delivery and death, among women dying from puerperal causes — 28
14. Cause of death as shown by interview, and trimester of pregnancy among women dying from puerperal causes — 29
15. All live births in the State and deaths, mortality rate, and trimester of pregnancy among white and colored women dying from puerperal causes in all the States included in the study and in specified States having 2,000 or more colored births annually — 30
16. All live births in the State, and deaths, mortality rate, and trimester of pregnancy among women dying from puerperal causes in urban and rural areas of each State included in the study — 31
17. Result of pregnancy of white and colored women dying from puerperal causes — 32
18. Cause of death as shown by interview and result of pregnancy of women dying from puerperal causes who had reached the last trimester of pregnancy — 34
19. Number of pregnancies of white and colored women dying from puerperal causes — 35
20. Number of deaths and mortality rate among white and colored women dying in specified age periods from puerperal causes — 35
21. Cause of death as shown by interview, among married and unmarried women dying from puerperal causes — 36
22. Number of deaths of married and unmarried women dying in specified age periods from puerperal causes — 37
23. Prenatal care received by white and colored women dying in urban and rural areas from puerperal causes — 42

Table | Page

24. Incidence of specified tests among white and colored women who had received prenatal care, dying in urban and rural areas from puerperal causes 45
25. Cause of death as shown by interview, grade of prenatal care, and trimester of pregnancy among women dying from puerperal causes 46
26. Number of pregnancies of women for whom a report on prenatal care was obtained and applicable among women dying from puerperal causes 49
27. Prenatal care received and result of pregnancy among women dying from puerperal causes who had reached the last trimester of pregnancy 50
28. Prenatal care received by white and colored women for whom a report was obtained and applicable among women dying from puerperal causes in all the States included in the study and in specified States having 2,000 or more colored births annually 51
29. Prenatal care received by women for whom a report was obtained and applicable among women dying from puerperal causes in urban and rural areas of each State included in the study 52
30. Relation between percentage of women receiving prenatal care and mortality rate among women dying (*a*) from all puerperal causes, (*b*) from all puerperal causes after they reached the last trimester of pregnancy, and (*c*) from puerperal albuminuria and convulsions, in each State included in the study 54
31. Relation between percentage of women receiving grade I prenatal care and mortality rate among women dying (*a*) from all puerperal causes after they reached the last trimester of pregnancy and (*b*) from puerperal albuminuria and convulsions, in each State included in the study 54
32. Attendant at confinement and technique of principal physician among women dying from puerperal causes who had reached the last trimester of pregnancy 56
33. Attendant at confinement of women who had reached the last trimester of pregnancy dying from puerperal causes in each State included in the study 58
34. Technique of principal physician at confinement of women dying from puerperal septicemia and from all other puerperal causes who had reached the last trimester of pregnancy 61
35. Vaginal examinations and use of rubber gloves by principal physician at confinement of women dying from puerperal causes who had reached the last trimester of pregnancy 61
36. Vaginal and rectal examinations made by principal physician at confinement of women dying from puerperal causes who had reached the last trimester of pregnancy 62
37. Frequency of operative deliveries and other operations among white and colored women dying from puerperal causes in urban and rural areas 66
38. Type of operation for delivery performed on women dying from puerperal causes who had reached the last trimester of pregnancy 67
39. Percent distribution of principal operations for delivery performed on primiparae and multiparae of each age period dying from puerperal causes who had reached the last trimester of pregnancy 70
40. Hours in labor and type of principal operation for delivery performed on primiparae and multiparae dying from puerperal causes who had reached the last trimester of pregnancy 72
41. Type of principal operation for delivery and technique of physician performing final operation on women dying from puerperal causes who had an operation for delivery in the last trimester of pregnancy 73
42. Onset of labor among white and colored women dying from puerperal causes who had reached the last trimester of pregnancy 74
43. Termination of labor among white and colored women dying from puerperal causes who had reached the last trimester of pregnancy 75

Table Page

44. Onset and termination of labor among primiparae and multiparae dying from puerperal causes who had reached the last trimester of pregnancy 75
45. Onset and termination of labor among women dying from puerperal causes who had not reached the last trimester of pregnancy 81
46. Onset of labor among white and colored women dying from puerperal causes who had not reached the last trimester of pregnancy 82
47. Termination of labor among white and colored women dying from puerperal causes who had not reached the last trimester of pregnancy 83
48. Trimester of pregnancy and type of principal operation for delivery performed on white and colored women dying from puerperal causes in urban and rural areas 84
49. Frequency of operation for delivery among all women who died from puerperal causes and among those who died after reaching the last trimester of pregnancy for whom there was a report on operation for delivery; each State included in the study 87
50. Principal indication for Cesarean section among white and colored women and women in urban and rural areas who died following Cesarean section 92
51. Number of pregnancies and frequency of Cesarean section among women for whom there was a report on operation for delivery, who died from puerperal causes and who died after reaching the last trimester of pregnancy 93
52. Frequency of Cesarean section in each age period among all primiparae and multiparae dying from puerperal causes and among those dying after they had reached the last trimester for whom there was a report on operation for delivery 93
53. Principal indication for Cesarean section and result of pregnancy among women who died following Cesarean section 96
54. Principal indication for Cesarean section and anesthetic used for women who died following Cesarean section 97
55. Frequency of Cesarean section among all women who died from puerperal causes and among those who died after reaching the last trimester of pregnancy for whom there was a report on operation for delivery; each State included in the study 97
56. Cause of death as shown by interview according to the international classification and immediate cause of death as shown by special study of the schedules among women who died following Cesarean section 101
57. Principal indication for Cesarean section and immediate cause of death as shown by special study of the schedules among primiparae and multiparae who died following Cesarean section 102
58. Cause of death as shown by interview for women who died following abortion, and trimester of pregnancy among women dying from puerperal causes who had not reached the last trimester of pregnancy 104
59. Cause of death as shown by interview among women who died following abortion of each specified type 105
60. Period of gestation among women who died following abortion of each specified type 107
61. Type of operation performed on women who died following abortion of each specified type 107
62. Relation between curettage and fever and deaths from puerperal septicemia and from all other puerperal causes among women who died following abortion of each specified type 109
63. Relation between curettage and fever and deaths from puerperal septicemia and from all other puerperal causes among women having hemorrhage and among women not having hemorrhage who died following abortion of each specified type 110
64. Age at death of women who died following abortion of each specified type among women dying from puerperal causes 111

Table Page

65. Type of abortion and mortality rate among white and colored women and women in urban and rural areas who died following abortion --- 112
66. Number and percentage of women whose deaths followed abortion of each specified type and whose deaths did not follow abortion among women dying from puerperal causes in each State included in the study --- 113
67. Principal operation for delivery performed on women dying from puerperal septicemia and on all women dying from puerperal causes who had reached the last trimester of pregnancy --- 120
68. Principal operation other than for delivery performed on women dying from puerperal septicemia and on all women dying from puerperal causes who had reached the last trimester of pregnancy --- 120
69. Time between delivery and appearance of symptoms and type of termination of labor among women dying from puerperal septicemia who had reached the last trimester of pregnancy --- 121
70. Time between delivery and appearance of symptoms and hours in labor among women dying from puerperal septicemia who had reached the last trimester of pregnancy --- 122
71. Attendant at confinement and technique of principal physician among white and colored women dying from puerperal septicemia who had reached the last trimester of pregnancy --- 124
72. Vaginal examinations and use of rubber gloves by principal physician at confinement of women dying from puerperal septicemia and from all other puerperal causes who had reached the last trimester of pregnancy --- 126
73. Place of development of sepsis and hospitalization at delivery or abortion of women dying from puerperal septicemia --- 128
74. Number of deaths, mortality rate, and trimester of pregnancy among white and colored women dying in urban and rural areas from puerperal septicemia --- 129
75. Number of deaths, mortality rate, and trimester of pregnancy among women dying from puerperal septicemia in urban and rural areas of each State included in the study --- 130
76. Number of deaths, mortality rate, and trimester of pregnancy among white and colored women dying from puerperal septicemia in specified States having 2,000 or more colored births annually --- 131
77. Number and percentage of abortions of specified type among women dying from puerperal septicemia in each State included in the study --- 132
78. Mortality rate from puerperal septicemia following abortion and not following abortion in each State included in the study --- 132
79. Relation between mortality rates from puerperal phlegmasia alba dolens, embolus, sudden death and (*a*) "other accidents of labor", and (*b*) percentage of women having medical care before they were moribund among those who died from all puerperal causes in each State included in the study --- 137
80. Trimester of pregnancy and grade of prenatal care received by white and colored women dying from puerperal albuminuria and convulsions --- 142
81. Time between first visit of patient to physician and death and grade of prenatal care given to women dying from puerperal albuminuria and convulsions --- 143
82. Condition when first seen by physician, of white and colored women and women dying in urban and rural areas from puerperal albuminuria and convulsions --- 145
83. Onset of labor and trimester of pregnancy among white and colored women and women in urban and rural areas dying from puerperal albuminuria and convulsions --- 146
84. Termination of labor and trimester of pregnancy among white and colored women and women in urban and rural areas dying from puerperal albuminuria and convulsions --- 147

Table Page
85. Type of principal operation for delivery performed on women dying from puerperal albuminuria and convulsions who had reached the last trimester of pregnancy 148
86. Number and percentage of deaths and mortality rate among white and colored women dying from puerperal albuminuria and convulsions in all the States included in the study and in specified States having 2,000 or more colored births annually 150
87. Number and percentage of deaths and mortality rate among women dying from puerperal albuminuria and convulsions in urban and rural areas of each State included in the study 151
88. Primary cause of death of women whose deaths were associated with pernicious vomiting of pregnancy 152
89. Period of gestation of women whose deaths were associated with pernicious vomiting of pregnancy 152
90. Number of deaths from all puerperal causes and number and percentage of deaths from puerperal hemorrhage in each age period among primiparae and multiparae dying from puerperal causes 156
91. Number and percentage of deaths and mortality rate among white and colored women dying in urban and rural areas from puerperal hemorrhage 157
92. Number and percentage of deaths and mortality rate among white and colored women dying from puerperal hemorrhage in all the States included in the study and in specified States having 2,000 or more colored births annually 158
93. Number and percentage of deaths and mortality rate among women dying from puerperal hemorrhage in urban and rural areas of each State included in the study 158
94. Warning bleeding and treatment of placenta previa among women whose deaths were associated with placenta previa 159
95. Type of principal operation for delivery performed on women whose deaths were associated with placenta previa 160
96. Type of principal operation for delivery performed on women dying from puerperal hemorrhage exclusive of placenta previa 161
97. Parity and hours in labor for women who died following ruptured uterus 168
98. Number and percentage of deaths and mortality rate of women whose deaths were associated with ectopic gestation in urban and rural areas of each State included in the study 172
99. Number and percentage of deaths and mortality rate of white and colored women whose deaths were associated with ectopic gestation in all the States included in the study and in specified States having 2,000 or more colored births annually 173
100. Relation between percentage of deaths associated with ectopic gestation and percentage of hospitalization among women dying from puerperal causes in each State included in the study 174
101. Number and percentage of deaths associated with ectopic gestation among primiparae and multiparae dying in specified age periods from all puerperal causes 175
102. Duration of symptoms before operation for women operated on and before death for women not operated on for ectopic gestation, among women whose deaths were associated with ectopic gestation 176
103. Type of other operation performed for women operated on and not operated on for ectopic gestation among women whose deaths were associated with ectopic gestation 177

APPENDIX TABLES

Table Page
I. Cause of death as shown by interview and trimester of pregnancy among white and colored women dying from puerperal causes in urban and rural areas 183
II. Registration by the American Medical Association, approval by the American College of Surgeons, and bed capacity of hospitals in which women were hospitalized at death; women dying from puerperal causes 186
III. Registration by the American Medical Association, approval by the American College of Surgeons, and bed capacity of hospitals in which women were hospitalized at delivery; women dying from puerperal causes who had reached the last trimester of pregnancy 187
IV. Observance of minimum standards for obstetric service recommended by the American College of Surgeons, and delivery-room and training-school facilities in hospitals in which women were hospitalized at death; women dying from puerperal causes 188
V. Observance of minimum standards for obstetric service recommended by the American College of Surgeons, and delivery-room and training-school facilities in hospitals in which women were hospitalized at delivery; women dying from puerperal causes who had reached the last trimester of pregnancy 189
VI. Cause of death as shown by interview according to interval between delivery and death, among women dying from puerperal causes 190
VII. Cause of death as shown by interview and number of pregnancies among women dying from puerperal causes 191
VIII. Cause of death as shown by interview and parity among women dying in specified age periods from puerperal causes 192
IX. Prenatal care received by white and colored unmarried women dying in urban and rural areas from puerperal causes 195
X. Hospitalization and trimester of pregnancy of unmarried women dying from puerperal causes 195
XI. Type of operation for delivery in each trimester of pregnancy and cause of death as shown by interview among women dying from puerperal causes 196
XII. Type of operation for delivery and number of pregnancies among women dying from puerperal causes who had reached the last trimester of pregnancy 198
XIII. Onset of labor, cause of death as shown by interview, and trimester of pregnancy among women dying from puerperal causes 199
XIV. Termination of labor, cause of death as shown by interview, and trimester of pregnancy among women dying from puerperal causes 202
XV. Type of operation other than for delivery, cause of death as shown by interview, and trimester of pregnancy among women dying from puerperal causes 204
XVI. Type of operation for delivery in each trimester of pregnancy among women dying from puerperal causes in each State included in the study 206
XVII. Live births, and deaths and mortality rate following abortions among white and colored women and women dying in urban and rural areas in each State included in the study 208
XVIII. Number and percentage of white and colored women and women in urban and rural areas whose deaths followed abortion of each specified type and whose deaths did not follow abortion among women dying from puerperal causes in each State included in the study 209

CHARTS

Chart		Page
I.	States included in maternal-mortality study	xiv
II.	Maternal mortality rates, by cause	18
III.	Maternal mortality rates by cause and by trimester of pregnancy	29
IV.	Type of issue among women dying from puerperal causes	33
V.	Prenatal care among women dying from puerperal causes	41
VI.	Operations for delivery in the last trimester of pregnancy among women dying from puerperal causes	83
VII.	Abortions among women dying from puerperal causes	106
VIII.	Mortality rates for death following abortion among women dying from puerperal causes	112
IX.	Condition when first seen by physician of women who died from puerperal albuminuria and convulsions	144

LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF LABOR,
CHILDREN'S BUREAU,
Washington, September 15, 1933.

MADAM: There is transmitted herewith a report on Maternal Mortality in Fifteen States. The study was made under the supervision of Dr. Blanche M. Haines (the former director of the maternity and infant-hygiene division of the Children's Bureau) and of the Bureau's obstetric advisory committee (see p. 1), which also studied many of the individual schedules and furnished the comments and recommendations for the report. The plan for the study was outlined by its chairman, Dr. Robert L. DeNormandie. The material was analyzed and the report was written by Dr. Frances C. Rothert, who also coordinated the taking of schedules in the several States.

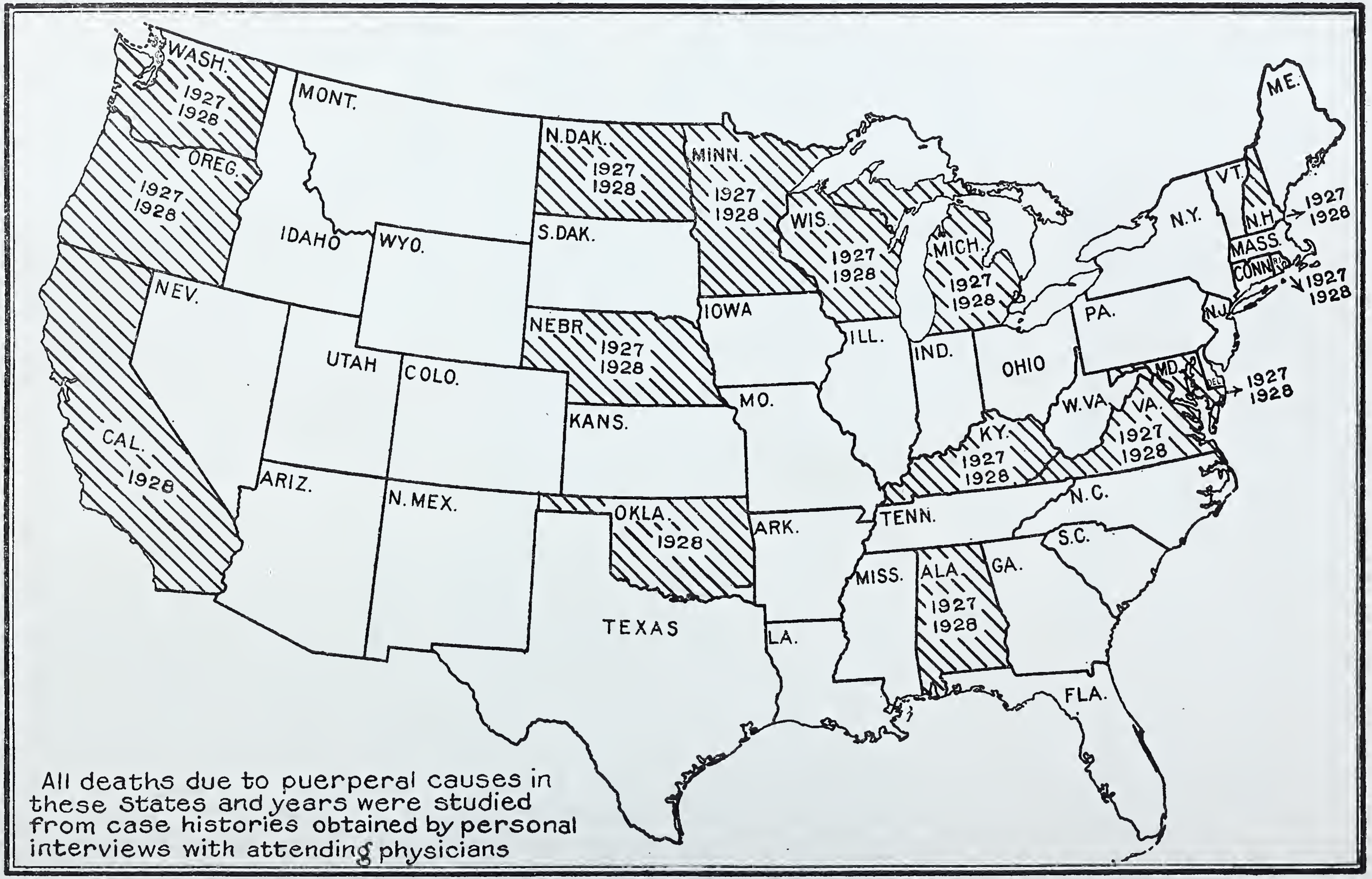
The Children's Bureau acknowledges with appreciation the assistance given by the bureaus of child hygiene and of vital statistics of the State departments of health in the States included and by the officers of the State medical societies of those States.

Respectfully submitted.

GRACE ABBOTT, *Chief.*

HON. FRANCES PERKINS,
Secretary of Labor.

CHART I.—STATES INCLUDED IN MATERNAL-MORTALITY STUDY


WASH. 1927 1928
OREG. 1927 1928
CAL. 1928
MONT.
IDAHO
WYO.
NEV.
UTAH
COLO.
ARIZ.
N. MEX.
N. DAK. 1927 1928
S. DAK.
NEBR. 1927 1928
KANS.
OKLA. 1928
TEXAS
MINN. 1927 1928
IOWA
MO.
ARK.
LA.
WIS. 1927 1928
ILL.
MICH. 1927 1928
IND.
OHIO
KY. 1927 1928
TENN.
MISS.
ALA. 1927 1928
GA.
FLA.
S.C.
N.C.
VA. 1927 1928
W. VA.
MD.
DEL. → 1927 1928
PA.
N.J.
N.Y.
VT.
N.H. → 1927 1928
ME.
MASS.
CONN. R.I. → 1927 1928

All deaths due to puerperal causes in these States and years were studied from case histories obtained by personal interviews with attending physicians

MATERNAL MORTALITY IN FIFTEEN STATES[1]

SCOPE AND METHOD OF THE STUDY

The maternal mortality rate in this country is generally recognized as high, and it has shown comparatively slight changes over a period of years. Moreover, information concerning the maternal deaths in the United States has hitherto been available from two sources—death certificates and birth certificates, which give very limited information about all deaths in a given territorial or governmental unit, and studies that give more complete information about the deaths in selected groups, such as those in a hospital or those in a physician's practice. Information from the first source was not sufficiently detailed and information from the second source was not sufficiently general to give a picture of the conditions surrounding the 16,000 deaths annually assigned to causes associated with pregnancy and childbirth. Accordingly, at a conference of the State directors in charge of the administration of the Maternity and Infancy Act, held at the Children's Bureau in 1926, a plan for a study of factors influencing the maternal death rate was presented by the chairman of the obstetric advisory committee of the Children's Bureau [2] and was published in the proceedings of the conference.[3]

It was decided that a study be made only in those States which were included in the birth-registration area and in which both the State board of health and the State medical society made formal request for it and assured the cooperation of the physicians of the State. The Children's Bureau undertook to prepare, with the assistance of the obstetric advisory committee, a schedule for use in all the States studied, and to report the findings. In the preparation of the schedule standards of prenatal care previously set up by the obstetric advisory committee [4] were considered, as were hospital standards and standards of obstetric care in hospitals approved by the American College of Surgeons.[5]

In accordance with this plan all deaths assigned to puerperal causes in 13 States in 1927, and in these same States and two others in 1928 were studied by the United States Children's Bureau and its obstetric advisory committee and the State departments of health. The States in which the study was conducted for both years are Alabama, Kentucky, Maryland, Michigan, Minnesota, Nebraska, New Hampshire, North Dakota, Oregon, Rhode Island, Virginia, Washington, and Wisconsin. California and Oklahoma joined in the study for 1928 only. In Michigan, Wisconsin, Minnesota, North Dakota, California, and Oklahoma all or most of the schedules and in Alabama some of them were taken by physicians on the staffs of the State departments of health. The other schedules were taken by physicians on the staff of the Children's Bureau.[6]

---

[1] An abstract of this report has been published as Maternal Deaths; a brief report of a study made in 15 States (U.S. Children's Bureau Publication No. 221, Washington, 1933, 60 pp.). A brief résumé was published in the American Journal of Obstetrics and Gynecology for August 1933.

[2] The members of the obstetric advisory committee are: Dr. Robert L. DeNormandie, instructor in obstetrics, Harvard Medical School, chairman; Dr. Fred L. Adair, professor of obstetrics and gynecology, University of Chicago; Dr. Rudolph W. Holmes, professor of obstetrics, Northwestern University Medical School, Chicago; Dr. Frank W. Lynch, professor of obstetrics and gynecology, University of California Medical School; Dr. James R. McCord, professor of obstetrics and gynecology, Emory University School of Medicine, Atlanta; Dr. C. Jeff Miller, professor of gynecology, Tulane University of Louisiana School of Medicine, New Orleans; Dr. Otto H. Schwarz, professor of obstetrics and gynecology, Washington University School of Medicine, St. Louis; Dr. Alice N. Pickett, assistant professor of obstetrics, University of Louisville School of Medicine, Louisville.

[3] How to Make a Study of Maternal Mortality, by Robert L. DeNormandie, M.D., Proceedings of the Third Annual Conference of State Directors in Charge of the Local Administration of the Maternity and Infancy Act of Nov. 23, 1921, pp. 42–52. U.S. Children's Bureau Publication No. 157. Washington, 1926.

[4] Standards of Prenatal Care; an outline for the use of physicians. U.S. Children's Bureau Publication No. 153. Washington, 1925.

[5] American College of Surgeons, Fourteenth Year Book, 1927, p. 71.

The 15 States included in the study are fairly well distributed geographically and are fairly typical of the sections in which they are located. The entire western coast is included (California for only 1 year, however) and so perhaps is overrepresented, as are, probably, the North Central agricultural States. None of the Rocky Mountain States is included, but conditions in eastern Washington, Oregon, and California, are, in general, somewhat similar to those in the States just east of them. Representation of the northeastern industrial States and the far South is somewhat meager. (See chart I, p. XIV.)

The composition of the population for the group of 15 States included in the study conforms very closely to that of the United States as a whole according to the census of 1920. In the 15 States 91 percent of the population were white and 9 percent colored; in the United States 90 percent were white and 10 percent colored.[7]

The distribution of the population, however, was less similar in respect to urban and rural groups for the States of the study and the United States as a whole. In the 15 States included in the study 36 percent of the population were in urban areas and 64 percent in rural areas.[8] In the entire United States 42 percent of the population lived in cities of 10,000 or more and 58 percent in rural areas.

In the 15 States and during the years of the study the deaths of 7,537 women were assigned to puerperal causes by the United States Bureau of the Census in accordance with the International List of Causes of Death. These 7,537 deaths made up 26 percent of the 29,298 deaths from puerperal causes in the United States birth-registration area for the 2 years. In the States of the study 47 percent (3,546) of the maternal deaths were urban and 53 percent (3,991) were rural; in the birth-registration area for these 2 years 54 percent of the maternal deaths were urban and 46 percent rural.

The deaths were distributed more similarly as to color. In the States and years of the study 18 percent and in the birth-registration area in these years 19 percent of the maternal deaths were of colored women.

---

[6] The following persons made the interviews in the different States: Alabama—Dr. Wade H. Garner, Dr. Charles M. Lacy, Dr. Robert A. Berry, Dr. William H. Abernathy, and Margaret Murphy, R.N.; Kentucky—Dr. Frances C. Rothert, Dr. Frances M. Hennessy, and Dr. Janice Rafuse; Maryland—Dr. Margaret Swigart; Michigan—Dr. Joseph H. Curhan, Dr. Dorothy L. Green, and Dr. Florence Knowlton; Minnesota—Dr. William H. Rumpf and Dr. Ruth G. Nystrom; Nebraska—Dr. Herman M. Jahr and Dr. MaBelle True; New Hampshire and Rhode Island—Dr. Hennessy; North Dakota—Dr. Maysil M. Williams, Dr. M. May Allen, and Dr. Iva Stevens Merritt; Oregon—Dr. Mildred McBride; Virginia—Drs. Swigart, Rothert, Hennessy, and Rafuse; Washington—Dr. Harold L. Kennedy, Dr. Harvey J. Felch, and Dr. Paul W. Spickard; Wisconsin—Dr. Charlotte J. Calvert; California—staff physicians of the State department of health under the supervision of Dr. Ellen S. Stadtmuller and Dr. Swigart; Oklahoma—Dr. True, Dr. David M. Cowgill, Dr. Margaret Dubois, and Dr. Louise Smith King.

[7] In accordance with the practice of the U.S. Bureau of the Census the term "colored" is used throughout the report to include Negro and other races such as Japanese, Chinese, and Indians. In 1930 Mexicans (previously classified as white) were reported with "other races" by the U.S. Bureau of the Census.

[8] In the vital-statistics reports of the Bureau of the Census cities of 10,000 or more population are classified as urban; the remainder of each State is classified as rural.

As there were 1,176,603 live births [9] in the States and during the years of the study, these 7,537 deaths gave a maternal mortality rate of 64 per 10,000 live births; in the birth-registration area for 1927 and 1928 together the maternal mortality rate was 67. Conditions as regards maternal mortality were evidently better in the States studied. The four States admitted to the birth-registration area in 1928 all had higher rates than the area as a whole for that year; if they had been in the area in both years of the maternal-mortality study the rate for the area for the two years would probably have been higher. The birth-registration area in 1928 included all the continental United States with the exception of 4 States, 2 of which were admitted in 1929. It is not probable that the inclusion of these 4 States would have lowered maternal mortality rates in 1927 and 1928.

The regions studied, then, are probably fairly representative of the United States as a whole with some overemphasis on the Pacific Coast and North Central States, and some underemphasis on the Rocky Mountain regions, the far South, and the eastern industrial centers. Conditions as regards maternal mortality were apparently better in the regions studied—they were certainly not worse—than those obtaining in the United States as a whole.

Copies were made of all certificates of deaths assignable to puerperal causes as reported to the State departments of health. Birth certificates were matched to these where possible. The physicians or other persons signing the death and birth certificates were then visited, as well as other physicians or midwives to whom the interviewers were referred. Except in very rare instances—usually where there was no physician—families were not visited. Hospitals and clinics in which the patient had received care were visited, and, with the consent of the attending physician, the case records were studied. This consent was practically never refused. The physicians interviewed cooperated most heartily, giving freely of their time and confidence and helping in every possible way. Although comparatively few had kept case histories, most of them had only too vivid recollection of these cases.

About certain cases very little information except that on the death and birth certificates could be obtained because of the death, serious illness, or permanent removal from the State of the attending physician. These cases represented, however, only a very small percentage of the total.

Rather more frequent were the deaths concerning which the attending physician himself knew very little. Sometimes he had been called in for the first time when the patient was dying, and it was impossible for him to obtain an accurate history. Sometimes, as when the interview was delayed for some reason, he had forgotten some or all of the details of the case. In most of these cases no laboratory work other than urinalysis or blood-pressure examination had been done.

For cases in which there had been no attending physician it was very difficult to obtain anything like a good medical history. The midwives attending the women in these States were practically all untrained women. Any instruction they might have had, had been directed almost exclusively toward cleanliness, noninterference, and prophylaxis against ophthalmia neonatorum. Most of them, therefore, had noticed only the very obvious symptoms. Most of the midwives who were observing and cooperative could give fairly clear descriptions of symptoms under careful questioning, but others were so engrossed in their own weird ideas of pathology that they could offer almost no information of value. If an old "granny" was convinced that the patient died because her "womb had growed to her liver", no clear story of mere symptoms would be forthcoming. A few of the midwives, particularly among the southern Negroes, could not be found.

---

[9] Live births include all births that were so reported on the transcripts of births sent to the U.S. Bureau of the Census. The rules of statistical practice adopted in 1908 by the section on vital statistics of the American Public Health Association define birth as "the instant of complete separation of the entire body * * * of the child from the body of the mother * * *." "A child * * * dying a moment, no matter how brief, after birth, was a living child * * *." A rule adopted in 1913 states that "no child that shows any evidence of life after birth should be registered as a stillbirth" and that the words "*any evidence of life* shall include action of heart, breathing, movement of voluntary muscle."

Collection of data was begun in February 1927, and most of the schedules were completed before July 1, 1929. All schedules were sent to the Children's Bureau for statistical examination, and tabulations were made there. Close contact between the interviewers and the Bureau was maintained in order to keep the interpretation of the schedules uniform. To insure conformity to the census records, the schedules were checked to the Census Bureau's transcripts of the death certificates as soon as they were available, which, for the 1928 deaths, was in the summer and autumn of 1929. Additional cases found at the Bureau of the Census that had not been classified by the States as puerperal were listed and sent to the interviewers for study. Most of the additional interviewing and matching of schedules was completed by January 1930, but a few States sent in some schedules as late as June 1930.

GENERAL CONSIDERATIONS

CAUSE OF DEATH

CLASSIFICATION OF DEATHS ACCORDING TO INTERNATIONAL LIST

The International List of Causes of Death (revision of 1920)[1] was used as the chief basis for the analysis of these deaths. Deaths classified in accordance with this list as due to the puerperal state are those of which complications of pregnancy, delivery, or the puerperium were the only cause or the most important cause. The titles included are as follows:

143. Accidents of pregnancy.
    a. Abortion.
        This item includes miscarriage, missed abortion, premature labor, etc. This item will be referred to throughout this report as "abortion or premature labor" (no. 143a). (Abortion as generally used in this report is defined as the termination of a uterine pregnancy before the period of viability; i.e., the first two trimesters.)
    b. Ectopic gestation.
    c. Others under this title.
        This item includes antepartum hemorrhage, chorea of pregnancy, pernicious vomiting of pregnancy, cornual pregnancy, hydatid mole, pregnancy (unqualified), and others.
144. Puerperal hemorrhage.
    a. Placenta previa.
    b. Others under this title.
        This item includes postpartum hemorrhage, accidental hemorrhage, puerperal hemorrhage (unqualified), and so forth.
145. Other accidents of labor.
    a. Cesarean section.
    b. Other surgical operations and instrumental delivery.
    c. Others under this title.
        This item includes (1) rupture of the uterus or bladder during parturition; (2) abnormal or difficult labor, faulty presentation, inversion of uterus, version during labor, and so forth; (3) lacerations of cervix or perineum, postpuerperal shock, labor (unqualified), and similar terms.
146. Puerperal septicemia.
    This item includes postpartum sepsis, postabortive sepsis, infected tubal pregnancy, puerperal peritonitis or abscess, pyelitis following childbirth, and so forth.
147. Puerperal phlegmasia alba dolens, embolus, sudden death.
148. Puerperal albuminuria and convulsions.
    This item includes pyelitis or pyelonephritis of pregnancy, puerperal eclampsia, nephritis, toxemia, tetanus, and uremia.
149. Following childbirth (not otherwise defined).
    This item includes puerperal insanity.
150. Puerperal diseases of the breast.

When more than one puerperal cause appears on a death certificate the death is assigned to one of them in accordance with definite rules, which are published in the Manual of Joint Causes of Death.[2] For example: If Cesarean section and embolism appear on a death certificate, the death is assigned to Cesarean section (no. 145a); if Cesarean section and eclampsia appear, the death is assigned to puerperal albuminuria and convulsions (no. 148); if Cesarean section, eclampsia, and peritonitis appear, the death is assigned to puerperal septicemia (no. 146).

---

[1] Manual of the International List of Causes of Death, 1920. U.S. Bureau of the Census. Washington, 1924.

[2] Manual of Joint Causes of Death Showing Assignment to the Preferred Title of the International List of Causes of Death When Two Causes are Simultaneously Reported. U.S. Bureau of the Census. Washington, 1925.

When both puerperal and nonpuerperal causes appear on the death certificate the rules governing classification are, in general, as follows:

1. If one of the more serious acute infectious diseases, such as typhoid fever, smallpox, diphtheria, or if cancer or syphilis,[3] or if an external cause, such as accident or homicide (including criminal abortion), appears on a woman's death certificate in addition to a puerperal cause, her death is assigned to that cause and not to the puerperal cause. (Influenza, however, does not take precedence over any puerperal cause except "other accidents of pregnancy", "following childbirth (not otherwise defined)", and "puerperal diseases of the breast.")
2. Puerperal septicemia takes precedence over all puerperal or nonpuerperal causes except the ones mentioned.
3. Tuberculosis in most forms takes precedence over all puerperal causes except puerperal septicemia.
4. Other serious chronic diseases, such as cardiac valvular disease, chronic nephritis, diabetes, and others, take precedence over all puerperal causes except the most severe complications of childbirth.
5. The term "pregnancy" appearing on a death certificate causes a death to be classified as puerperal only when it appears alone or with a term denoting a mild disorder, or with a cause implying a complication of pregnancy.

The application of these rules to the various puerperal causes is more fully discussed in the sections dealing with those causes.

It will be seen, therefore, that not all deaths of pregnant or parturient women are assigned to a puerperal cause; also that a group of causes classified under a title in the International List of Causes of Death is not identical with the group that would be classified under the same term if that term were used to denote a medical entity. For instance, the title Cesarean section (no. 145a), as was noted, does not include all deaths of women who had had Cesarean sections. The title abortion (no. 143a) not only does not include all the deaths following abortion, defined as the termination of a previable uterine pregnancy, but it does include some deaths that did not follow abortion so defined. On the whole, however, the titles describe the causes included under them, and the system of preferences usually results in the assignment of a death to the title denoting that condition which was chiefly responsible.

Although the International List of Causes of Death has been used as the chief basis for the analysis of the deaths studied, the discussion in certain of the sections that follow will be based on the whole group of deaths associated with certain conditions, such as abortion, ectopic gestation, or Cesarean section, and not merely on the cases that were assigned to those titles as the principal cause of death.

---

[3] Syphilis seldom appears on a maternal-death certificate. In the birth-registration area in 1925 (the latest year for which the Bureau of the Census has tabulated contributory causes of death) a puerperal cause was contributory to syphilis in only 52 cases.

The revision of 1920 of the international list was followed in this study because it was in use at the time these deaths were classified. The list was revised by the international commission late in 1929. The important changes are: (1) Puerperal septicemia (old no. 146) is divided into abortion with septic conditions (no. 140), ectopic gestation with septic conditions specified (no. 142a), and puerperal septicemia not specified as due to abortion (old no. 145); (2) puerperal albuminuria and convulsions (old no. 148) is divided into puerperal albuminuria and eclampsia (no. 146) and other toxemias of pregnancy (no. 147) (which also includes chorea and pernicious vomiting of pregnancy from the old subtitle no. 143c); (3) old nos. 143a, 143b, and 143c are changed to nos. 141, 142b, and 143, respectively; old no. 147 becomes no. 148, and old no. 145 becomes no. 149 without change of name or content; (4) following childbirth not otherwise defined (old no. 149) and puerperal diseases of the breast (old no. 150) are combined into other and unspecified conditions of the puerperal state (no. 150).

The rules for the assignment of joint causes as previously given apply also to the 1929 list.

The new subdivisions are such that comparisons of deaths classified according to the 1929 list with those classified under the 1920 list are possible. Comparison of the deaths in this study with deaths classified according to the 1929 revision will be facilitated by subdivisions similar in general to those in the 1929 list. (For a fuller discussion of the 1929 revision of the International List of Causes of Death see appendix B, p. 212.)

COMPARISON OF CAUSES ORIGINALLY ASSIGNED AND THOSE FOUND THROUGH INTERVIEWS

The 7,537 deaths classified by the United States Bureau of the Census, in accordance with the international list, as due to puerperal causes in the States and during the years of the study include not only those originally so certified by the physician, but those added as a result of answers to queries by the Bureau of the Census and by State bureaus of vital statistics about certificates originally showing ill-defined causes. Of this total, 7,380 were found, by means of interviews in connection with the present study, to have been actually puerperal in the meaning of the international classification, and 157 were found to have been nonpuerperal. Only the 7,380 puerperal deaths were given detailed study.

There were, however, other puerperal deaths in the States of the study during 1927 and 1928 that were not registered as puerperal and so were not studied. The United States Bureau of the Census and State bureaus of vital statistics make every effort, through the querying of indefinite causes of death given on certificates for women of child-bearing age, to have the list of maternal deaths complete. The success of their efforts and the accuracy and completeness of the information available as to the extent of maternal mortality in this country depend in the last analysis on the accuracy and completeness with which physicians and other attendants make out the death certificates. Physicians and others occasionally told interviewers of deaths that would have been classified as puerperal if registered and if accurately certified; but certificates for these deaths either were not found or were found to have been so filled out that the death was not classified as puerperal. These deaths were not included in the study because it would have been impracticable to discover all such deaths and because the deaths classified as puerperal by the Bureau of the Census had been determined upon as the basis of the investigation. The experience of the interviewers makes it probable that the number of puerperal deaths not included in the census figures exceeded the number of nonpuerperal deaths that were included. *Thus the Census Bureau rates may be lower than the actual rates; and the rates used in the present study are still lower, being based on the 7,380 puerperal deaths remaining after the exclusion of 157 found on interview to have been nonpuerperal (table 1).*

TABLE 1.—*Cause of death* [1] *as given on the death certificate and as shown by interview, and mortality rate among women whose deaths were assigned to puerperal causes*

Cause of death [1]	Deaths from causes as given on death certificate			Deaths from causes as shown by interview		
	Number	Percent distribution	Rate per 10,000 live births	Number	Percent distribution	Rate per 10,000 live births
All causes	7,537			7,537		
Puerperal	**7,537**	**100**	**64.1**	**7,380**	**100**	**62.7**
Accidents of pregnancy	770	10	6.5	719	10	6.1
Abortion, premature labor	*368*	*5*	*3.1*	*353*	*5*	*3.0*
Ectopic gestation	*264*	*4*	*2.2*	*248*	*3*	*2.1*
Others	*138*	*2*	*1.2*	*118*	*2*	*1.0*
Puerperal hemorrhage	758	10	6.4	791	11	6.7
Other accidents of labor	812	11	6.9	652	9	5.5
Cesarean section	*155*	*2*	*1.3*	*136*	*2*	*1.2*
Other surgical operations and instrumental delivery	*76*	*1*	*.6*	*109*	*1*	*.9*
Others	*581*	*8*	*4.9*	*407*	*6*	*3.5*
Puerperal septicemia	2,827	38	24.0	2,948	40	25.1
Puerperal phlegmasia alba dolens, embolus, sudden death	337	4	2.9	344	5	2.9
Puerperal albuminuria and convulsions	2,006	27	17.0	1,900	26	16.1
Following childbirth (not otherwise defined)	24	(2)	.2	23	(2)	.2
Puerperal diseases of the breast	3	(2)	(3)	3	(2)	(3)
Nonpuerperal				**157**		

[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Less than 1 percent.
[3] Less than one tenth per 10,000.

Deaths will be spoken of throughout the report as having been "assigned" or "attributed" to the individual causes of death. The term "assigned" is used of the official classification by the Bureau of the Census, as in the first 3 columns of table 1; the term "attributed" is used as referring to the classification after interview, for purposes of this study, as in the last 3 columns of table 1.

CHANGES IN CLASSIFICATION WITHIN THE PUERPERAL GROUP

Changes in classification within the puerperal group were also made as a result of the interviews in many of the 7,380 cases given detailed study (table 2). For instance, 770 deaths were assigned to accidents of pregnancy from information given on the death certificates, but

32 of these were among the deaths classified after the interviews as nonpuerperal. Of the 738 still classified as puerperal after the interviews the assignment to accidents of pregnancy was verified in 635 cases; but it was found that the death should have been assigned to puerperal hemorrhage in 16 cases, to other accidents of labor in 8 cases, to puerperal septicemia in 63 cases, to puerperal phlegmasia alba dolens, embolus, sudden death in 7 cases, and to puerperal albuminuria and convulsions in 9 cases. The interviews resulted in the assignment of larger numbers of deaths to puerperal septicemia, puerperal hemorrhage, and puerperal phlegmasia alba dolens, and of smaller numbers to puerperal albuminuria and convulsions, accidents of pregnancy, and other accidents of labor. These changes will be discussed in the sections dealing with the individual causes of death.

Reasons for the changes were various. Many were the results of second thought on the part of the physician. Some of the 558 autopsies were performed after the death certificates were signed, and a few of the coroners signing death certificates were interested chiefly in showing that the death was from natural causes. Clerical errors by physicians or by those transcribing certificates for the Bureau of the Census occasionally led to erroneous classification. Lack of knowledge of the International List of Causes of Death often led to the omission of statements by physicians, which, if made, would have caused the Bureau of the Census to classify the deaths differently.

Table 2.—*Classification of cause of death* [1] *as given on the death certificate and as shown by interview among women whose deaths were assigned to puerperal causes*

Cause of death [1] as given on death certificate	Cause of death [1] as shown by interview										
	Total	Classified as puerperal									Classified as non-puerperal
		Total	Accidents of pregnancy	Puerperal hemorrhage	Other accidents of labor	Puerperal septicemia	Puerperal phlegmasia alba dolens, embolus, sudden death	Puerperal albuminuria and convulsions	Following childbirth (not otherwise defined)	Puerperal diseases of the breast	
All causes	7, 537	7, 380	719	791	652	2, 948	344	1, 900	23	3	157
Accidents of pregnancy	770	738	635	16	8	63	7	9			32
Puerperal hemorrhage	758	756	26	703	5	15	2	4	1		2
Other accidents of labor	812	796	25	41	609	54	26	38	3		16
Puerperal septicemia	2, 827	2, 763	7	4	9	2, 717	4	22			64
Puerperal phlegmasia alba dolens, embolus, sudden death	337	334	2	12	4	28	286	1	1		3
Puerperal albuminuria and convulsions	2, 006	1, 966	22	15	14	69	19	1, 826	1		40
Following childbirth (not otherwise defined)	24	24	2		3	2			17		
Puerperal diseases of the breast	3	3								3	

---

[1] According to the Manual of the International List of Causes of Death, 1920.

SIGNATURE ON DEATH CERTIFICATE AND MEDICAL ATTENTION

Death certificates were signed in 7,046 of the 7,537 cases included in the study by physicians other than coroners, in 362 cases by coroners, and in 62 cases by others (a few of these were irregular practitioners not listed in the medical directory, and some were parents or husbands); 67 death certificates had no signature (table 3).

The fact that a physician signed a woman's death certificate did not always mean that he had attended her, nor did the fact that a death certificate was signed by a coroner or a nonmedical person, or was unsigned, always mean that the patient had had no medical attention. Physicians signed the death certificates of 65 women who had had no medical attention. Most of these were women who died before the arrival of the physician. In a few cases a physician signed the death certificate of a woman who had formerly been his patient, or with whom he was acquainted, and who had had no physician in her last illness. These women usually lived in remote places.

Of the entire group of 7,537 women who died, information as to medical attention was obtained for 7,466. One hundred and eighty-eight (3 percent) of this number had had no medical attention and 488 (7 percent) had had no medical attention until they were moribund.

TABLE 3.—*Signature on the death certificate and medical attention among women whose deaths were assigned to puerperal causes* [1]

Signature on death certificate	Women whose deaths were assigned to puerperal causes [1]				
	Total	Medical attention [2]			
		None	When patient was moribund	Before patient was moribund	Not reported
Total	7,537	188	488	6,790	71
Physician	7,046	65	428	6,513	40
Coroner	362	47	56	235	24
Other or none	129	76	4	42	7

[1] As given on the death certificates.

[2] See table 11 for medical attention given to the 7,380 women whose deaths were attributed to puerperal causes after interview.

Of 129 death certificates unsigned or signed by other persons than physicians or coroners, 76 were for women known to have had no medical attention. In 46 cases there was reported to have been some medical attention, though in a few cases this consisted of treatment by a practitioner not listed in the American Medical Directory. In other cases a physician had given the patient, who lived far from town, some care, but he did not see the patient at the time of her death nor sign the death certificate.

Most of the women whose death certificates were signed by coroners had had some medical attention. The practice in some hospitals of having the coroner sign the certificates of all deaths occurring soon after admission increased the number signed by coroners. Of the 362 death certificates signed by coroners, 47 were for women who had not had medical attention and 56 for women who had had medical attention only when dying. However, 235 were known to have had some earlier medical attention. Two hundred and thirty-eight of the 362 whose certificates were signed by coroners had had hospital treatment, 130 of them for less than 2 days.

SIGNATURE ON DEATH CERTIFICATE AND CHANGES IN CLASSIFICATION OF DEATHS

The changes made in the classification of deaths as a result of the interviews are shown in table 4. The cause of death as given to the interviewers was different from that to which the death had been assigned on the basis of information given on the certificate in 857 (12 percent) of the 7,046 cases certified by physicians, in 59 (16 percent) of the 362 cases certified by coroners, in 15 (24 percent) of the 62 certified by others, and in 23 (34 percent) of the 67 in which the death certificate was unsigned. A larger proportion of changes was made in the group of deaths certified as due to the indefinite term "other accidents of labor" than in those under any other title.

Table 4.—*Classification of cause of death [1] as certified, signature on death certificate, and change in classification following interview for women whose deaths were assigned to puerperal causes [2]*

Cause of death [1] as certified	Total	Women whose deaths were assigned to puerperal causes [2]											
		Signature on death certificate											
		Physician			Coroner			Other			None		
		Change in classification following interview			Change in classification following interview			Change in classification following interview			Change in classification following interview		
		None	To other puerperal causes	To non-puerperal causes	None	To other puerperal causes	To non-puerperal causes	None	To other puerperal causes	To non-puerperal causes	None	To other puerperal causes	To non-puerperal causes
All causes	7, 537	6, 189	707	150	303	56	3	47	13	2	44	21	2
Accidents of pregnancy	770	552	111	31	51	10	1	2	1		9	2	
Abortion, premature labor	*368*	*245*	*58*	*24*	*22*	*6*	*1*	*2*	*1*		*7*	*2*	
Ectopic gestation	*264*	*219*	*20*	*3*	*22*								
Others	*138*	*88*	*33*	*4*	*7*	*4*					*2*		
Puerperal hemorrhage	758	638	67	2	33	6		9			2	1	
Other accidents of labor	812	492	223	14	25	4		9	7		20	16	2
Cesarean section	*155*	*111*	*36*	*1*	*3*	*1*		*2*			*1*		
Other surgical operations and instrumental delivery	*76*	*52*	*20*	*3*					*1*				
Others	*581*	*329*	*167*	*10*	*22*	*3*		*7*	*6*		*19*	*16*	*2*
Puerperal septicemia	2, 827	2, 445	125	62	143	25	1	17	2	1	4	2	
Puerperal phlegmasia alba dolens, embolus, sudden death	337	278	46	3	6			1	2		1		
Puerperal albuminuria and convulsions	2, 006	1, 764	128	38	45	11	1	9	1	1	8		
Following childbirth (not otherwise defined)	24	17	7										
Puerperal diseases of the breast	3	3											

---

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] As given on the death certificate.

AUTOPSIES

Autopsies were known to have been performed in 571 of the 7,537 deaths certified as puerperal. They were performed in 130 (36 percent) of the 362 cases in which the coroner signed the death certificate, and in 441 (6 percent) of the 7,046 cases in which a physician other than the coroner signed the death certificate.

Thirteen of the autopsies were included in the 157 cases in which the death was certified as puerperal but was found at the interview with the attending physician to have been nonpuerperal. The remaining 558 constituted only 8 percent of the 7,380 cases found on interview to have been puerperal. As the question was not printed on the schedule except in the copy of the death certificate, and as the fact that an autopsy had been performed was not always noted on the death certificate, there may have been other autopsies concerning which information was not obtained. However, the fact that an autopsy had been performed is likely to have been mentioned in most cases by the attending physician or on the hospital chart, and the autopsy diagnosis to have been entered on the schedule by the interviewer. In 87 of the 129 coroners' cases and in 383 of the 429 other cases finally classified as puerperal in which an autopsy was performed death had occurred in a hospital.

Of the 558 autopsies performed in cases classified as puerperal after interview 489 were on white women and 69 on colored women. There were only 112 autopsies on women who died in rural areas (which includes cities of less than 10,000 inhabitants in 1920); 105 of these 112 women were white and 7 were colored. Of the 446 women dying in urban areas on whom autopsies were performed, 384 were white and 62 were colored.

In 99 of the 129 coroners' autopsy cases included in the study the death had occurred before the seventh month. In 62 of these 99 cases there had been induced abortion other than therapeutic; in 8 there had been spontaneous abortion; in 12 the type of abortion could not be determined; and in 17 there had been no abortion. In 174 of the 429 autopsy cases in which the death certificates had been signed by physicians other than coroners the death had occurred before the seventh month. In 70 of these 174 cases there had been induced abortion other than therapeutic; in 33 there had been spontaneous abortion; in 12 there had been therapeutic abortion; in 9 the type of abortion could not be determined; and in 50 there had been no abortion. It is probable that in a considerable number of cases, particularly coroners' cases, the chief purpose of the autopsy was to discover whether or not there had been an induced abortion.

Of the 558 deaths followed by autopsy that were included in the 7,380 deaths studied, 77 (14 percent) were caused by accidents of pregnancy (including 29 cases (5 percent) of abortion and premature labor, 40 cases (7 percent) of ectopic gestation, and 8 cases (1 percent) of other accidents of pregnancy); 26 (5 percent) were caused by puerperal hemorrhage, 48 (9 percent) by other accidents of labor, 309 (55 percent) by puerperal septicemia, 25 (4 percent) by puerperal phlegmasia alba dolens, embolus, sudden death, and 73 (13 percent) by puerperal albuminuria and convulsions. Comparison of these figures with those in table 1 (p. 8) shows that the proportions of deaths due to ectopic gestation and to puerperal septicemia were larger in these autopsy cases than in the entire group of cases studied, and the proportions of deaths due to puerperal hemorrhage and to puerperal albuminuria and convulsions were smaller. As puerperal septicemia includes septic abortion, this probably means merely that autopsies were more likely to be performed in cases in which the diagnosis was doubtful.

DEATHS EXCLUDED FROM STUDY BECAUSE FOUND TO BE NONPUERPERAL

Pregnancy or childbirth was a contributory factor in 89 of the 157 deaths classified by the Bureau of the Census as puerperal but found on interview to have been due primarily to conditions which, if certified on the death certificate, would have resulted in assignment to nonpuerperal causes. The causes to which the 157 deaths were attributed after interview and the presence or absence of pregnancy as a contributory factor are shown in the following list:

Cause of death attributed after interview	Total	Women pregnant or parturient	Women not recently pregnant
All causes	157	89	68
Chronic nephritis	32	25	7
Lobar pneumonia	18	18	--------
Tuberculosis	17	17	--------
Other infectious disease	8	5	3
Appendicitis, hernia, intestinal obstruction	12	5	7
Chronic cardiac valvular disease	13	12	1
Salpingitis and pelvic abscess	21	--------	21
Other diseases of the female genital organs	17	--------	17
Other causes	19	7	12

Pregnancy or childbirth may have been the final factor in certain of these deaths, particularly in those from chronic nephritis (see also p. 140), tuberculosis, and cardiac disease. But this was probably true also of other deaths from these causes which had been assigned by the Bureau of the Census to the nonpuerperal group. On the other hand, some of the 7,380 women whose deaths were included in the study had chronic nephritis, or chronic heart disease, or tuberculosis; the deaths of women who had had these diseases were excluded only when the condition had been definitely diagnosed and apparently was in itself sufficiently serious to cause death.

Sixty-eight of the 157 nonpuerperal deaths were of women who had had no recent pregnancy. In some cases the fact that the disorder resulting in death may have dated originally from pregnancy or childbirth probably accounted for their inclusion in the puerperal group; for instance, several of the deaths resulted from operations for retroverted uterus or perineal lacerations due to childbirth many years before. Others of these deaths were assigned to puerperal causes through errors in transcribing certificates. A few were stated by the physicians to have been not puerperal, but the "not" was omitted in copying. Some were the result of misreading nearly illegible certificates. For instance, purpura hemorrhagica was mistaken for puerperal hemorrhage; the words "psychosis", "cerebral", and "gonorrheal" were all mistaken for "puerperal." Considering that many thousands of death certificates were involved, the wonder is perhaps that the errors were so few.

Deaths following abortion found on interview with the physician to have been probably criminal abortion were not excluded on that account, although deaths *certified* as due to criminal abortion are not classified as puerperal in the international list and therefore were not included.

In accordance with the decision to exclude this group of 157 deaths from the detailed study, the tables that follow are based on the group of 7,380 deaths classified as puerperal after interviews with the attending physicians.

RACE AND NATIVITY

Deaths of colored women [4] made up 18 percent of those included in the study. *The maternal mortality rate of the colored women in the years and States of the study was nearly twice that of the white women.* Maternal mortality rates were significantly higher among colored women for every main cause of death except puerperal phlegmasia alba dolens, embolus, sudden death, which was about the same for both white and colored. For others under the title accidents of pregnancy, and for Cesarean section and other surgical operations and instrumental delivery, the differences were insignificant. The greatest difference was in the deaths from puerperal albuminuria and convulsions, which caused more than twice as many deaths per 10,000 live births among colored women as among white women (table 5 and chart II).

The reasons for these differences in the rates involve differences in social and economic conditions as well as medical and possibly certain purely racial factors.

In only 7 of the 15 States included in the study were there more than 2,000 colored live births annually. The State tables based on color are confined to these seven States: Alabama, California, Kentucky, Maryland, Michigan, Oklahoma, and Virginia. The maternal mortality rate was higher for colored women than for white women in each of these States. (See table 15, p. 30.)

Of the 6,072 white women whose deaths were included in the study, 5,109 were native born, 805 were foreign born, and the nativity of 158 was not reported. Thus 86 percent of the white women for whom nativity was reported were native born and 14 percent were foreign born.

In four of the States included in the study the percentage of foreign-born white women was small, and the number of live births to these women less than 2,000. In 8 of the other 11 States the maternal mortality rate for foreign-born white women was higher than that for the native white women (table 6).

---

[4] For definition of colored see Scope and Method of the Study, p. 2, footnote 7.

TABLE 5.—*Cause of death* [1] *as shown by interview, and mortality rate among white and colored women dying from puerperal causes*

Cause of death [1] as shown by interview	Women dying from puerperal causes						
		White			Colored		
	Total	Number	Per-cent distribution	Rate per 10,000 live births	Number	Per-cent distribution	Rate per 10,000 live births
All causes	**7,380**	**6,072**	**100**	**57.5**	**1,308**	**100**	**108.5**
Accidents of pregnancy	719	613	10	5.8	106	8	8.8
Abortion, premature labor	*353*	*301*	*5*	*2.9*	*52*	*4*	*4.3*
Ectopic gestation	*248*	*210*	*3*	*2.0*	*38*	*3*	*3.2*
Others	*118*	*102*	*2*	*1.0*	*16*	*1*	*1.3*
Puerperal hemorrhage	791	670	11	6.3	121	9	10.0
Other accidents of labor	652	525	9	5.0	127	10	10.5
Cesarean section	*136*	*123*	*2*	*1.2*	*13*	*1*	*1.1*
Other surgical operations and instrumental delivery	*109*	*97*	*2*	*.9*	*12*	*1*	*1.0*
Others	*407*	*305*	*5*	*2.9*	*102*	*8*	*8.5*
Puerperal septicemia	2,948	2,437	40	23.1	511	39	42.4
Puerperal phlegmasia alba dolens, embolus, sudden death	344	314	5	3.0	30	2	2.5
Puerperal albuminuria and convulsions	1,900	1,493	25	14.1	407	31	33.8
Following childbirth (not otherwise defined)	23	17	(2)	.2	6	(2)	.5
Puerperal diseases of the breast	3	3	(2)	(3)	-------	-------	-------

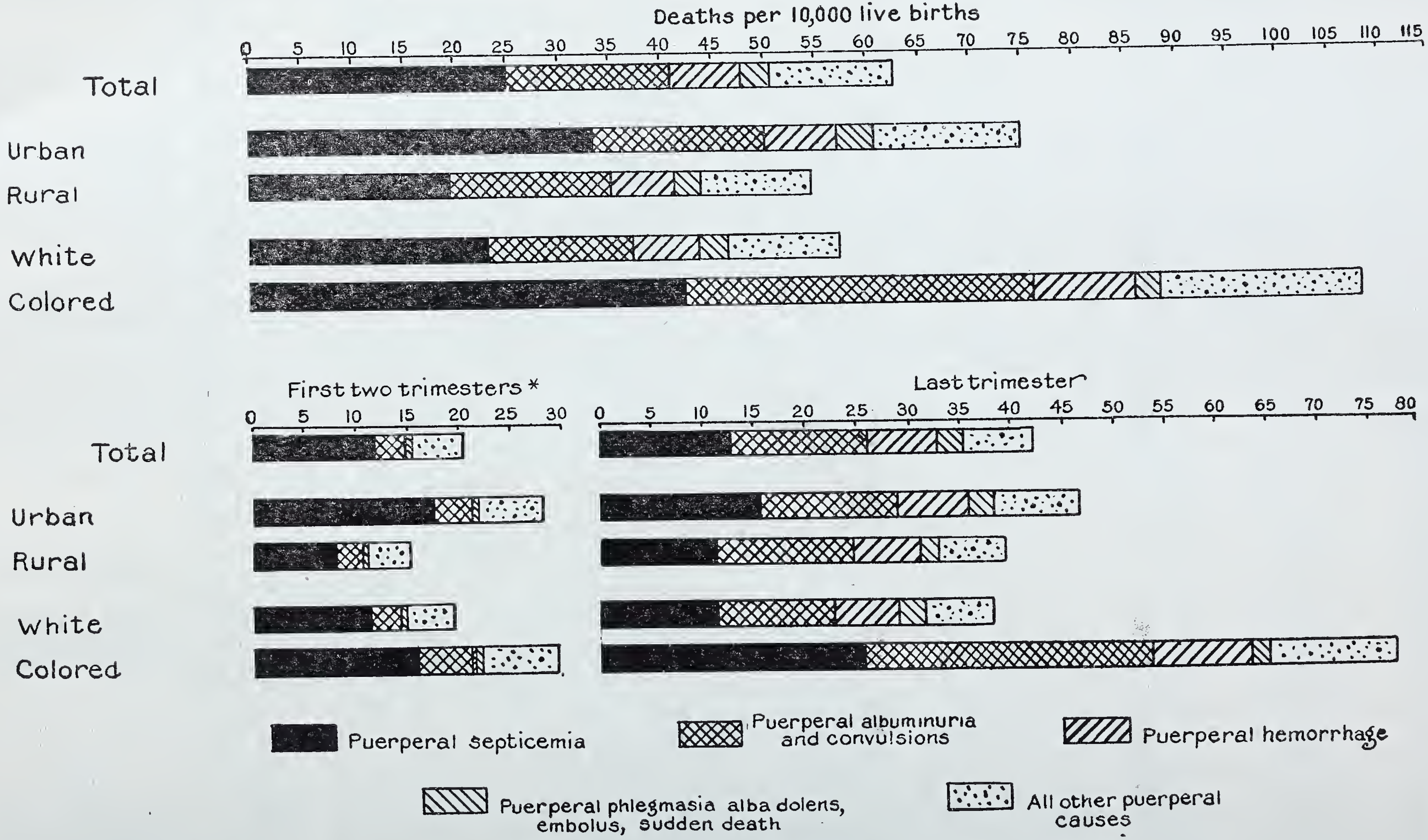
[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Less than 1 percent.
[3] Less than one tenth per 10,000.

TABLE 6.—*All live births in the State, deaths from puerperal causes, and mortality rate among native and foreign-born white women dying from puerperal causes in all the States included in the study and in specified States having 2,000 or more births to foreign-born white women in the biennium 1927–28*

State	Total white			Native white			Foreign-born white		
	Live births [1]	Deaths from puerperal causes		Live births [1]	Deaths from puerperal causes		Live births [1]	Deaths from puerperal causes	
		Number [2]	Rate per 10,000 live births		Number	Rate per 10,000 live births		Number	Rate per 10,000 live births
ALL STATES INCLUDED IN THE STUDY									
Total	1,056,063	6,072	57	931,376	5,109	55	123,864	805	65
STATES HAVING 2,000 OR MORE BIRTHS TO FOREIGN-BORN WHITE WOMEN IN THE BIENNIUM 1927–28									
California [3]	78,700	459	58	57,069	302	53	21,545	151	70
Maryland	51,172	273	53	46,989	244	52	4,167	22	53
Michigan	191,460	1,235	65	149,366	916	61	41,995	304	72
Minnesota	99,366	481	48	88,817	413	47	10,528	60	57
Nebraska	55,144	317	57	51,283	278	54	3,844	26	68
New Hampshire	17,459	109	62	13,165	80	61	4,277	23	54
North Dakota	29,300	155	53	24,640	126	51	4,654	27	58
Oregon	28,012	175	62	25,392	157	62	2,598	13	50
Rhode Island	26,274	159	61	16,578	106	64	9,680	48	50
Washington	44,609	291	65	38,501	229	59	6,083	47	77
Wisconsin	114,190	605	53	101,997	527	52	12,043	72	60

U.S. Bureau of the Census. Total live births include births to women for whom nativity was not reported.
[2] Includes deaths of women for whom nativity was not reported.
[3] Figures for 1928 only.

CHART II.—MATERNAL MORTALITY RATES, BY CAUSE



* In the bars showing rates for total, urban, rural, and white, the rate for puerperal hemorrhage (1 tenth per 10,000 live births) is too small to appear.

DEATHS IN URBAN AND RURAL AREAS

The maternal mortality rate was 36 percent higher in the urban districts (75 per 10,000 live births) than in the rural districts (55 per 10,000 live births) (table 7 and chart II). Urban areas include cities with 10,000 or more population as shown in the 1920 census. There were more urban than rural live births in California, Maryland, Michigan, New Hampshire, Rhode Island, and Washington; in the other States of the study rural births predominated. The maternal mortality rate was higher in the urban than in the rural districts in every State included in the study except New Hampshire. (See table 16, p. 31.)

TABLE 7.—*Cause of death* [1] *as shown by interview, and mortality rate among women dying in urban and rural areas from puerperal causes*

Cause of death [1] as shown by interview	Women dying from puerperal causes						
	Total	In urban areas			In rural areas		
		Number	Percent distribution	Rate per 10,000 live births	Number	Percent distribution	Rate per 10,000 live births
All causes	**7,380**	**3,462**	**100**	**75.1**	**3,918**	**100**	**54.8**
Accidents of pregnancy	719	351	10	7.6	368	9	5.1
Abortion, premature labor	*353*	*149*	*4*	*3.2*	*204*	*5*	*2.9*
Ectopic gestation	*248*	*150*	*4*	*3.3*	*98*	*3*	*1.4*
Others	*118*	*52*	*2*	*1.1*	*66*	*2*	*.9*
Puerperal hemorrhage	791	331	10	7.2	460	12	6.4
Other accidents of labor	652	294	8	6.4	358	9	5.0
Cesarean section	*136*	*88*	*3*	*1.9*	*48*	*1*	0.7
Other surgical operations and instrumental delivery	*109*	*56*	*2*	*1.2*	*53*	*1*	*.7*
Others	*407*	*150*	*4*	*3.3*	*257*	*7*	*3.6*
Puerperal septicemia	2,948	1,543	45	33.5	1,405	36	19.6
Puerperal phlegmasia alba dolens, embolus, sudden death	344	157	5	3.4	187	5	2.6
Puerperal albuminuria and convulsions	1,900	777	22	16.8	1,123	29	15.7
Following childbirth (not otherwise defined)	23	7	(2)	.2	16	(2)	.2
Puerperal diseases of the breast	3	2	(2)	(3)	1	(2)	(3)

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Less than 1 percent.

[3] Less than one tenth per 10,000.

The rates for the following groups: Accidents of pregnancy, other accidents of labor, puerperal septicemia, and puerperal phlegmasia alba dolens, embolus, sudden death, were significantly higher in urban than in rural areas. There was no significant difference in the other main groups. The greatest difference was in the rates from puerperal septicemia. Although the rate of death from sepsis among women who had reached the last trimester was somewhat greater in urban than in rural areas, the difference in the total rate was largely due to the higher rates for the first two trimesters (that is, from septic abortion [5]) in the cities. This will be discussed more fully in the section on puerperal septicemia (p. 116).

---

[5] Abortion means the termination of a previable uterine pregnancy.

URBAN RATES AFFECTED BY DEATHS OF NONRESIDENTS IN HOSPITALS

A certain number of rural women go for confinement to urban hospitals. Some of these have normal pregnancies; others go to the hospitals because abnormalities have been detected. Still others are delivered at home in the rural areas and are then taken to city hospitals on account of complications. When these women die in the cities their deaths are registered there. If they are delivered at home, the births are registered in the rural areas. The deaths of nonresidents in hospitals, therefore, would tend to raise urban maternal mortality rates in which residence is not taken into consideration.

Of the 3,462 maternal deaths in cities of 10,000 or more population (urban districts) 2,804 occurred in hospitals. Of these women 1,994 were said to have been residents of the city in which death occurred, 780 were said to have been nonresidents, and the place of residence of 30 was not reported. Therefore, of the 2,774 women dying in hospitals for whom residence was reported 28 percent were nonresidents. Some of these undoubtedly came from smaller to larger cities; but some came from rural districts, and the inclusion of these probably contributed to the higher urban rate (table 8).

There were more deaths of nonresidents in the hospitals of the smaller than in those of the larger cities. Of the 1,645 hospital deaths in cities of 100,000 or more population, 1,635 were of women whose residence was known, and of these 299 (18 percent) were nonresidents; of the 1,159 hospital deaths in cities of 10,000 to 100,000, 1,139 were of women whose residence was reported, and 481 (42 percent) of these were nonresidents.

A still larger proportion of the deaths in hospitals in places of less than 10,000 inhabitants (rural districts) were deaths of nonresidents. Of the 1,262 deaths in hospitals in these areas 1,232 were of women whose residence was reported, and 773 (63 percent) of these were nonresidents. Although some of these women may have come from urban areas, most of them came from other small cities and towns and from the country.

To determine the effect of this factor on both urban and rural maternal mortality rates, it would be necessary to know the number of deaths of rural women in the urban areas and of urban women in the rural areas; the number of births to rural women in urban areas and the number of births to urban women in rural areas; and the number of women who died in each area after having been delivered in the other area. The information on births is lacking for the present study.

The city department of health of Baltimore, however, furnished a portion of this information for that city—the number of live births to nonresidents in Baltimore hospitals in 1927 and 1928. Live births to nonresidents in Baltimore that took place outside hospitals were not given. If the live births to nonresidents in hospitals were subtracted from the total Baltimore live births and the deaths of nonresidents in Baltimore hospitals were subtracted from the total number of maternal deaths in Baltimore, the maternal mortality rate would be 59 instead of the rate of 68 obtained when residence is disregarded. The presence in Baltimore of these hospitalized women from other places raised the Baltimore maternal mortality rate 9 points.

TABLE 8.—*Hospitalization and residence of women dying in hospitals among women dying from puerperal causes in urban and rural areas of each State included in the study*

State and area	Women dying from puerperal causes									
	Total	Hospital cases							Not hospital cases	Not reported whether hospital cases
		Total	Death in hospital				Death not in hospital	Place of death not reported		
			Total	Resident	Nonresident	Residence not reported				
Total	**7,380**	**4,213**	**4,066**	**2,453**	**1,553**	**60**	**146**	**1**	**3,153**	**14**
Urban	3,462	2,872	2,804	1,994	780	30	68	--------	584	6
Rural	3,918	1,341	1,262	459	773	30	78	1	2,569	8
Alabama	**1,118**	**325**	**309**	**139**	**170**	--------	**16**	--------	**790**	**3**
Urban	293	214	205	109	96	--------	9	--------	77	2
Rural	825	111	104	30	74	--------	7	--------	713	1
California	**493**	**401**	**386**	**246**	**114**	**26**	**14**	**1**	**92**	--------
Urban	298	262	256	188	49	19	6	--------	36	--------
Rural	195	139	130	58	65	7	8	1	56	--------
Kentucky	**645**	**205**	**202**	**99**	**98**	**5**	**3**	--------	**438**	**2**
Urban	153	116	115	77	37	1	1	--------	37	--------
Rural	492	89	87	22	61	4	2	--------	401	2
Maryland	**382**	**277**	**267**	**170**	**96**	**1**	**10**	--------	**105**	--------
Urban	257	223	219	160	59	--------	4	--------	34	--------
Rural	125	54	48	10	37	1	6	--------	71	--------
Michigan	**1,312**	**889**	**851**	**659**	**184**	**8**	**38**	--------	**418**	**5**
Urban	922	742	717	588	122	7	25	--------	177	3
Rural	390	147	134	71	62	1	13	--------	241	2
Minnesota	**491**	**347**	**341**	**215**	**122**	**4**	**6**	--------	**144**	--------
Urban	225	216	214	155	59	--------	2	--------	9	--------
Rural	266	131	127	60	63	4	4	--------	135	--------
Nebraska	**329**	**193**	**192**	**102**	**87**	**3**	**1**	--------	**135**	**1**
Urban	123	100	100	73	27	--------	--------	--------	23	--------
Rural	206	93	92	29	60	3	1	--------	112	1
New Hampshire	**109**	**77**	**77**	**38**	**39**	--------	--------	--------	**32**	--------
Urban	54	47	47	30	17	--------	--------	--------	7	--------
Rural	55	30	30	8	22	--------	--------	--------	25	--------
North Dakota	**159**	**94**	**90**	**23**	**67**	--------	**4**	--------	**64**	**1**
Urban	31	30	29	7	22	--------	1	--------	1	--------
Rural	128	64	61	16	45	--------	3	--------	63	1
Oklahoma	**300**	**135**	**129**	**70**	**54**	**5**	**6**	--------	**164**	**1**
Urban	93	72	71	47	22	2	1	--------	21	--------
Rural	207	63	58	23	32	3	5	--------	143	1
Oregon	**177**	**135**	**129**	**65**	**64**	--------	**6**	--------	**42**	--------
Urban	81	78	76	50	26	--------	2	--------	3	--------
Rural	96	57	53	15	38	--------	4	--------	39	--------
Rhode Island	**165**	**117**	**115**	**63**	**52**	--------	**2**	--------	**47**	**1**
Urban	157	114	112	62	50	--------	2	--------	42	1
Rural	8	3	3	1	2	--------	--------	--------	5	--------
Virginia	**767**	**363**	**344**	**177**	**164**	**3**	**19**	--------	**404**	--------
Urban	276	224	219	141	77	1	5	--------	52	--------
Rural	491	139	125	36	87	2	14	--------	352	--------
Washington	**316**	**256**	**249**	**154**	**93**	**2**	**7**	--------	**60**	--------
Urban	183	165	161	118	43	--------	4	--------	18	--------
Rural	133	91	88	36	50	2	3	--------	42	--------
Wisconsin	**617**	**399**	**385**	**233**	**149**	**3**	**14**	--------	**218**	--------
Urban	316	269	263	189	74	--------	6	--------	47	--------
Rural	301	130	122	44	75	3	8	--------	171	--------

ACCESSIBILITY AND MEDICAL ATTENTION

Of the 7,311 women for whom a report on medical attention was obtained, 184 (3 percent) had had no medical attention from the beginning of pregnancy till death and 488 (7 percent) had received medical attention only when moribund (that is, when actually dying) (table 9). However, these figures do not show the cases in which medical attendance was delayed, perhaps by distance, until too late to be of much benefit to the patient, even though she was not actually dying when the physician arrived.

Table 9.—*Accessibility of physician and medical attention received by women dying from puerperal causes*

Accessibility of physician	Women dying from puerperal causes				
	Total	Medical attention			
		None	When patient was moribund	Before patient was moribund	Not reported
Total	**7,380**	**184**	**488**	**6,639**	**69**
Physician in same city or town	*3,956*	*54*	*209*	*3,667*	*26*
Physician not in same city or town or patient in open country:					
Distance less than 5 miles	*704*	*20*	*71*	*611*	*2*
Bad roads or slow transportation	65	4	6	55	
Transportation good or fair	639	16	65	556	2
Distance 5 miles, less than 10	*833*	*34*	*83*	*713*	*3*
Bad roads or slow transportation	106	8	10	87	1
Transportation good or fair	727	26	73	626	2
Distance 10 miles, less than 25	*894*	*33*	*69*	*792*	
Bad roads or slow transportation	147	20	25	102	
Transportation good or fair	747	13	44	690	
Distance 25 miles or more	*309*	*5*	*20*	*283*	*1*
Bad roads or slow transportation	35	3	5	27	
Transportation good or fair	274	2	15	256	1
No report on accessibility	*684*	*38*	*36*	*573*	*37*

In the strictly rural areas distance from a physician may become an important reason for lack of early and sufficient medical attention, partly because of the actual distance and partly because of the charge for country travel on a mileage basis in addition to the usual medical fees.

The accessibility of the physician was reported on for 6,696 of the women who died of puerperal causes in the years and States of the study. Of these 3,956 were in the same city or town as the physician. Of the remaining 2,740 women, 1,203 (44 percent) were 10 miles or more from the physician, and 182 had the additional handicap of very poor roads, practically impassable to automobiles, or slow transportation—sometimes horseback. A distance of 25 miles or more separated 309 women from the physician, and in 35 of these cases the roads were bad for at least part of this distance.

Lack of medical attention was more frequent when there was no physician living in the vicinity, but it was not always associated with inaccessibility of a physician. Of the 3,930 women who lived in places where a physician was near by and for whom a report as to medical attention was obtained, 263 (7 percent) had had no care or care only when dying.

Of the 182 women who were 10 miles or more from a physician and were inaccessible for other reasons also, 53 (29 percent) had died without medical attention or had had medical attention only when actually dying.

In table 10 the 6,696 deaths concerning which there was a report as to accessibility are divided into three groups: Cases in which the patient and the physician were in the same vicinity, cases in which the patient was separated from the physician not only by distance but also by poor roads or slow transportation, and cases in which the patient was at some distance from the physician but there was no mention of other inaccessibility. The causes of death in these three groups showed interesting differences, particularly in the larger proportion of deaths in the poor-roads group that were assigned to hemorrhage and to the rather vague "others" under other accidents of labor. In the group in which the physician was in the same vicinity there was a smaller proportion of deaths due to puerperal albuminuria and convulsions than in either of the other groups and a larger proportion assigned to puerperal septicemia. This last was due in part to the many induced abortions in the cities.

In North Dakota, Oregon, Minnesota, Nebraska, New Hampshire, Washington, and Wisconsin more than half the women who had not lived in the same city or town as a physician had lived 10 or more miles distant. But in all these States some of the women who lived at the greater distances had received medical attention before they were moribund. In North Dakota 32 women who died of puerperal causes lived 25 miles or more from a physician. All these had had medical attention at some time before death, but 2 of them did not receive it until they were dying. In Oregon all the 31 women who were living 25 miles or more from a physician had had some medical attention before death, but 4 of them had received it only when they were dying. In Washington 3 of the 13 women who lived 25 miles or more from a physician had had medical attention only when dying or not at all; but 6 women living in the vicinity of physicians had had no medical attention, and 12 had had such attention only when dying.

Poor roads and slow transportation are greater factors in inaccessibility than mere distance. Eight miles on horseback over a mountain trail may take longer to travel than 30 miles on a fair automobile road. Apparently more patients were really inaccessible in the Kentucky and Virginia mountains than in the western States where distances were greater. Of the 136 women in Kentucky who had lived 10 miles or more from a physician, 67 had had poor roads or slow transportation as an additional handicap, and 35 of these 67 had had medical attention only when dying or not at all. Of the 158 women in Virginia who lived 10 miles or more from a physician, 41 lived on poor roads or could be reached only by slow methods of transportation. In only 6 instances, however, was no medical attention obtained before the patient was moribund.

TABLE 10.—*Cause of death* [1] *as shown by interview and accessibility of physician among women dying from puerperal causes*

Cause of death [1] as shown by interview	Women dying from puerperal causes								
	Total	Physician in same city or town		Physician not in same city or town or patient in open country				Accessibility not reported	
				Bad roads or slow transportation		Transportation good or fair			
		Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
All causes	**7,380**	**3,956**	**100**	**353**	**100**	**2,387**	**100**	**684**	**100**
Accidents of pregnancy	719	396	10	28	8	228	10	67	10
Abortion, premature labor	*353*	*192*	*5*	*19*	*5*	*113*	*5*	*29*	*4*
Ectopic gestation	*248*	*150*	*4*	*4*	*1*	*67*	*3*	*27*	*4*
Others	*118*	*54*	*1*	*5*	*1*	*48*	*2*	*11*	*2*
Puerperal hemorrhage	791	415	10	59	17	266	11	51	7
Placenta previa	*347*	*187*	*5*	*27*	*8*	*111*	*5*	*22*	*3*
Other	*444*	*228*	*6*	*32*	*9*	*155*	*6*	*29*	*4*
Other accidents of labor	652	351	9	41	12	192	8	68	10
Cesarean section	*136*	*95*	*2*	*2*	*1*	*26*	*1*	*13*	*2*
Other surgical operations and instrumental delivery	*109*	*73*	*2*	*4*	*1*	*26*	*1*	*6*	*1*
Others	*407*	*183*	*5*	*35*	*10*	*140*	*6*	*49*	*7*
Puerperal septicemia	2,948	1,696	43	122	35	846	35	284	42
Puerperal phlegmasia alba dolens, embolus, sudden death	344	226	6	3	1	82	3	33	5
Puerperal albuminuria and convulsions	1,900	860	22	100	28	763	32	177	26
Following childbirth (not otherwise defined)	23	9	(2)			10	(2)	4	1
Puerperal diseases of the breast	3	3	(2)						

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Less than 1 percent.

In Alabama 56 women died without medical attention, but there was a report on the accessibility of only 34 of them. Thirty-one of these lived less than 10 miles from a physician, and there was no mention of poor roads or slow transportation. Of the 120 Alabama women who were first seen when dying, 101 were known to have lived less than 10 miles from a physician, and there was no further evidence of inaccessibility (table 11).

TABLE 11.—*Medical attention received by women dying from puerperal causes in each State included in the study*

State	Women dying from puerperal causes								
	Total	Medical attention							
		Total reported	None		When patient was moribund		Before patient was moribund		Not reported
			Number	Percent	Number	Percent	Number	Percent	
Total	7,380	7,311	184	3	488	7	6,639	91	69
Alabama	1,118	1,094	56	5	120	11	918	84	24
California	493	484	13	3	23	5	448	93	9
Kentucky	645	642	37	6	55	9	550	86	3
Maryland	382	382	5	1	23	6	354	93	--------
Michigan	1,312	1,297	7	1	62	5	1,228	95	15
Minnesota	491	486	9	2	21	4	456	94	5
Nebraska	329	328	4	1	15	5	309	94	1
New Hampshire	109	108	1	1	4	4	103	95	1
North Dakota	159	158	3	2	17	11	138	87	1
Oklahoma	300	297	1	(1)	15	5	281	95	3
Oregon	177	177	4	2	10	6	163	92	--------
Rhode Island	165	164	1	1	8	5	155	95	1
Virginia	767	764	28	4	64	8	672	88	3
Washington	316	315	9	3	19	6	287	91	1
Wisconsin	617	615	6	1	32	5	577	94	2

[1] Less than 1 percent.

HOSPITALIZATION

Of the 7,380 women included in the study there was a report on hospitalization for all but 14. More than half (4,213) were hospitalized at some time during their final illness. The deaths of 4,066 women occurred in hospitals, but the deliveries or abortions of only 2,629 occurred in hospitals. Several factors influence the number of hospital deaths, particularly the total number of hospital deliveries, the place of delivery of the women who die in hospitals, the prevalence of complicated cases in hospitals, and the number of abortion cases (table 12).

Unfortunately it was possible in only a few instances to obtain the number of deliveries that occurred in these hospitals, or even the number of live births occurring in hospitals and the number occurring in homes in the States of the study. The standard birth certificate contains an inquiry as to place of delivery, but this inquiry is frequently not answered. The Bureau of the Census does not tabulate live births by place of delivery, and only a few States make such tabulations. It is, therefore, impossible to calculate death rates for women delivered in hospitals and in homes.

Of the 4,066 women whose deaths occurred in hospitals, 2,501 had reached the last trimester, 1,558 had not reached the last trimester, and for 7 the period of gestation was not reported. Of the 2,501 who were known to have reached the last trimester of pregnancy, only 1,893 were in the hospital for delivery and less than half of these (845) were known to have planned hospitalization. Many of the women who were delivered in hospitals had been examined vaginally, and many even had had delivery attempted, before admission. For these reasons, even if the number of live births occurring in hos-

TABLE 12.—*Hospitalization and trimester of pregnancy of white and colored women dying from puerperal causes*

Trimester of pregnancy and hospitalization at delivery or abortion or at death if not delivered	Women dying from puerperal causes						
	Total	Hospital cases				Not hospital cases	Not reported whether hospital cases
		Total	Died in hospital				
			Yes	No	Not reported		
Total	**7,380**	**4,213**	**4,066**	**146**	**1**	**3,153**	**14**
Last trimester	*4,965*	*2,601*	*2,501*	*99*	*1*	*2,359*	*5*
In hospital	1,971	1,971	1,893	77	1		
Emergency	*1,018*	*1,018*	*996*	*22*			
Planned	*899*	*899*	*845*	*53*	*1*		
Not reported	*54*	*54*	*52*	*2*			
Not in hospital	2,990	626	605	21		2,359	5
Not reported whether in hospital	4	4	3	1			
First 2 trimesters	*2,381*	*1,605*	*1,558*	*47*		*769*	*7*
In hospital	658	658	643	15			
Not in hospital	1,720	944	912	32		769	7
Not reported whether in hospital	3	3	3				
Trimester not reported	*34*	*7*	*7*			*25*	*2*
Not in hospital	29	2	2			25	2
Not reported whether in hospital	5	5	5				
WHITE							
Total	**6,072**	**3,733**	**3,608**	**124**	**1**	**2,326**	**13**
Last trimester	*4,027*	*2,280*	*2,195*	*84*	*1*	*1,743*	*4*
In hospital	1,725	1,725	1,658	66	1		
Emergency	*848*	*848*	*829*	*19*			
Planned	*827*	*827*	*781*	*45*	*1*		
Not reported	*50*	*50*	*48*	*2*			
Not in hospital	2,298	551	534	17		1,743	4
Not reported whether in hospital	4	4	3	1			
First 2 trimesters	*2,025*	*1,447*	*1,407*	*40*		*571*	*7*
In hospital	590	590	577	13			
Not in hospital	1,432	854	827	27		571	7
Not reported whether in hospital	3	3	3				
Trimester not reported	*20*	*6*	*6*			*12*	*2*
Not in hospital	15	1	1			12	2
Not reported whether in hospital	5	5	5				
COLORED							
Total	**1,308**	**480**	**458**	**22**		**827**	**1**
Last trimester	*938*	*321*	*306*	*15*		*616*	*1*
In hospital	246	246	235	11			
Emergency	*170*	*170*	*167*	*3*			
Planned	*72*	*72*	*64*	*8*			
Not reported	*4*	*4*	*4*				
Not in hospital	692	75	71	4		616	1
First 2 trimesters	*356*	*158*	*151*	*7*		*198*	
In hospital	68	68	66	2			
Not in hospital	288	90	85	5		198	
Trimester not reported and not in hospital	*14*	*1*	*1*			*13*	

pitals were obtained, maternal mortality rates in hospitals and outside hospitals would not be an index of the relative safety of hospitals and of homes as places for confinement.

Hospitalization was less frequent and more of it was of an emergency nature among the colored women than among the white women who died. It was more frequent in the urban group (83 percent) than in the rural group (34 percent). (See table 8, p. 21.) Of the women who died in the rural areas, 69 percent of those who died in places of 2,500 to 10,000 inhabitants and 19 percent of those who died in places of less than 2,500 inhabitants had been hospitalized.

The percentage of hospitalization among women who died in the different States studied ranged from 29 in Alabama to 81 in California and in Washington.

Size, equipment, and maintenance of hospital standards in the hospitals in which the deliveries or deaths of women who died of puerperal causes occurred in the States included in the study are given in appendix tables II to V (pp. 186–189). It may be noted that 333 women died in hospitals not registered by the American Medical Association; 174 women who died after reaching the last trimester had been delivered in such unregistered hospitals. Refusal of registration means that the American Medical Association had evidence of such irregular or unsafe practices that these hospitals were "deemed unworthy of being included in any published list of reputable hospitals."

INTERVAL BETWEEN TERMINATION OF PREGNANCY AND DEATH

Some of the women included in the study died undelivered; others lived for some time after the termination of their pregnancy (table 13). The interval between the birth, abortion, operation for ectopic gestation, or rupture of an unoperated ectopic gestation and death was reported in 6,303 cases. Death occurred within the first week in 55 percent of the cases (including 31 percent in which it occurred on the first day), in the second week in 19 percent, in the third week in 9 percent, in the fourth week in 5 percent, and after the fourth week in 12 percent. Death came soonest in fatal cases of hemorrhage, ruptured uterus, and instrumental delivery and was delayed longest in fatal sepsis. (See also appendix table VI, p. 190.)

TABLE 13.—*Percentage of deaths from selected causes*[1] *as shown by interview, according to interval between delivery*[2] *and death, among women dying from puerperal causes*

Cause of death[1] as shown by interview	Percentage of deaths according to interval between delivery[2] and death							
	Total	Less than 1 week			1 week, less than 2	2 weeks, less than 3	3 weeks, less than 4	4 weeks or more
		Total	Less than 1 day	1 day, less than 1 week				
All causes	100	55	31	24	19	9	5	12
Abortion, premature labor	100	72	35	38	12	9	1	6
Ectopic gestation	100	78	40	38	12	5	1	3
Placenta previa	100	97	88	9	2	1	1	-------
Other puerperal hemorrhage	100	95	88	7	3	1	(3)	1
Cesarean section	100	79	23	56	13	4	1	2
Other surgical operations and instrumental delivery	100	92	71	21	4	2	1	1
Ruptured uterus	100	96	76	20	-------	2	2	-------
Other accidents of labor	100	64	31	32	20	7	3	6
Puerperal septicemia	100	22	2	21	30	17	9	22
Puerperal phlegmasia alba dolens, embolus, sudden death	100	46	33	12	29	9	8	9
Puerperal albuminuria and convulsions	100	82	49	33	9	2	2	6

[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Also abortion, operation for ectopic gestation, or rupture of unoperated ectopic gestation.
[3] Less than 1 percent.

TRIMESTER OF PREGNANCY

About one third of the women included in the study had died before they reached the last trimester of pregnancy. The number of deaths due to the various causes differed considerably before and after the time of viability of the child, as is shown in table 14. Puerperal septicemia was the most important cause of death among women who had not reached the last trimester and accounted for 59 percent of the deaths in this group; but puerperal albuminuria and convulsions equaled puerperal septicemia in importance among women who had reached the last trimester, 31 percent of the deaths being attributed to each of these causes (chart III).

The distribution of these deaths by cause for urban and rural white women and urban and rural colored women is given in appendix table I (p. 183). Among the urban mothers, both white and colored, puerperal septicemia caused a larger proportion of the deaths of women who had reached the last trimester than puerperal albuminuria and convulsions; among the rural mothers, both white and colored, the reverse was true.

Mortality rates by trimester of pregnancy for white and colored women dying from puerperal causes in the States with 2,000 or more colored live births annually and for urban and rural women dying from puerperal causes in all the States studied are given in tables 15 and 16. The differences in the State maternal mortality rates reflect differences between States in the proportion of maternal deaths that occurred before the last trimester, as well as in the proportions of urban and rural and of white and colored in the population. For instance, in rural Alabama less than one fifth, and in urban Washington about one half, of the total maternal mortality was made up of deaths that occurred before the last trimester.

TABLE 14.—*Cause of death*[1] *as shown by interview, and trimester of pregnancy among women dying from puerperal causes*

Cause of death[1] as shown by interview	Women dying from puerperal causes									
	Total	Trimester of pregnancy								
		First trimester		Second trimester		Before last trimester, not otherwise specified		Last trimester		Not reported
		Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	
All causes	**7,380**	**1,299**	**100**	**672**	**100**	**410**	**100**	**4,965**	**100**	**34**
Accidents of pregnancy	719	363	28	140	21	72	18	142	3	2
Abortion, premature labor	*353*	*116*	*9*	*92*	*14*	*46*	*11*	*99*	*2*	------
Ectopic gestation	*248*	*203*	*16*	*16*	*2*	*21*	*5*	*8*	(2)	------
Others	*118*	*44*	*3*	*32*	*5*	*5*	*1*	*35*	*1*	*2*
Puerperal hemorrhage	791	------	------	10	1	1	(2)	779	16	1
Other accidents of labor	652	------	------	1	(2)	------	------	651	13	------
Cesarean section	*136*	------	------	*1*	(2)	------	------	*135*	*3*	------
Other surgical operations and instrumental delivery	*109*	------	------	------	------	------	------	*109*	*2*	------
Others	*407*	------	------	------	------	------	------	*407*	*8*	------
Puerperal septicemia	2,948	838	65	251	37	314	77	1,529	31	16
Puerperal phlegmasia alba dolens, embolus, sudden death	344	18	1	27	4	8	2	291	6	------
Puerperal albuminuria and convulsions	1,900	80	6	243	36	15	4	1,549	31	13
Following childbirth (not otherwise defined)	23	------	------	------	------	------	------	22	(2)	1
Puerperal diseases of the breast	3	------	------	------	------	------	------	2	(2)	1

---

[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Less than 1 percent.

CHART III.—MATERNAL MORTALITY RATES BY CAUSE AND BY TRIMESTER OF PREGNANCY

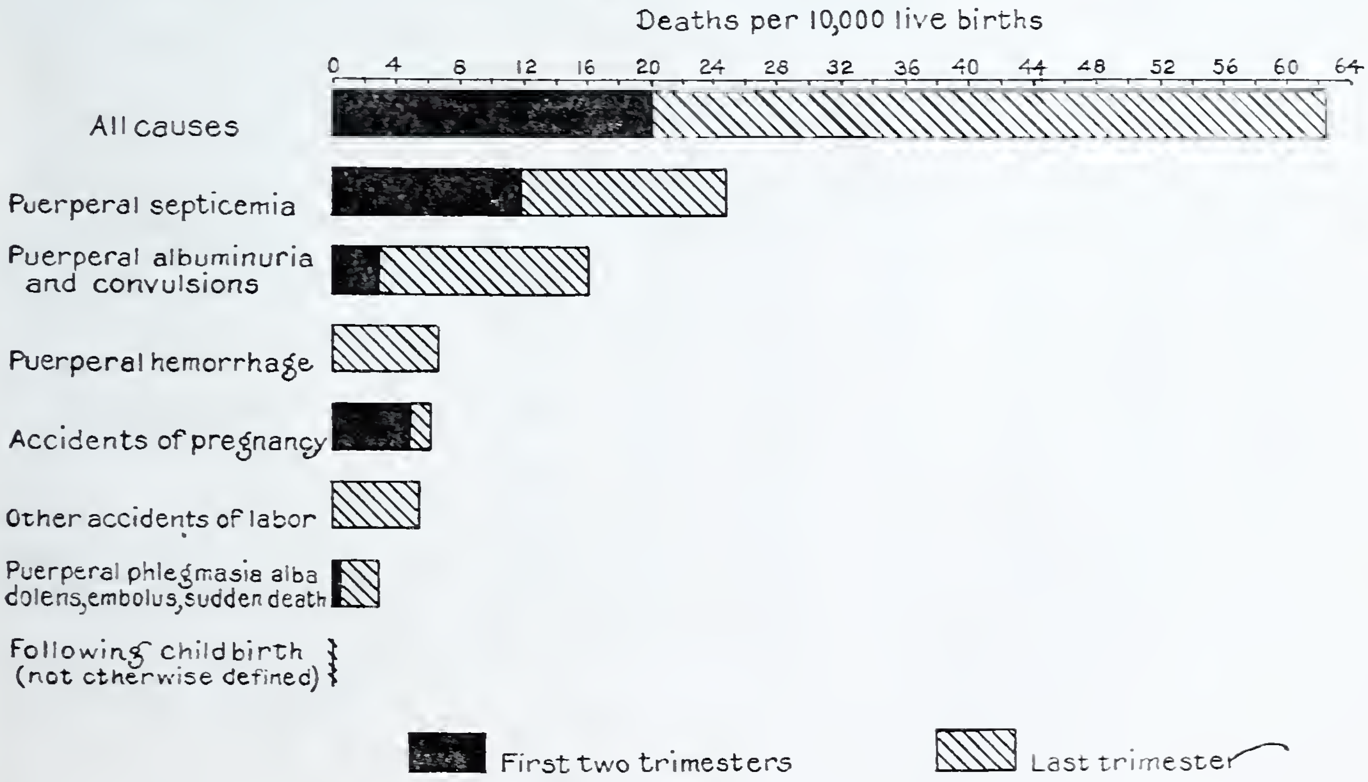


TABLE 15.—*All live births in the State and deaths, mortality rate, and trimester of pregnancy among white and colored women dying from puerperal causes in all the States included in the study and in specified States having 2,000 or more colored births annually*

State and color	Live births [1]	Women dying from puerperal causes						
		Total		Trimester of pregnancy				
				First two		Last		Not reported
		Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	
ALL STATES INCLUDED IN THE STUDY								
Total	1,176,603	7,380	63	2,381	20	4,965	42	34
White	1,056,063	6,072	57	2,025	19	4,027	38	20
Colored	120,540	1,308	109	356	30	938	78	14
STATES HAVING 2,000 OR MORE COLORED BIRTHS ANNUALLY								
Alabama	130,985	1,118	85	242	18	859	66	17
California	83,536	493	59	183	22	310	37	-------
Kentucky	121,798	645	53	210	17	428	35	7
Maryland	64,311	382	59	127	20	255	40	-------
Michigan	197,975	1,312	66	502	25	809	41	1
Oklahoma	42,986	300	70	107	25	190	44	3
Virginia	114,701	767	67	200	17	566	49	1
WHITE								
Alabama	85,010	577	68	127	15	444	52	6
California	78,700	459	58	171	22	288	37	-------
Kentucky	114,077	560	49	172	15	382	33	6
Maryland	51,172	273	53	98	19	175	34	-------
Michigan	191,460	1,235	65	472	25	762	40	1
Oklahoma	40,457	250	62	88	22	160	40	2
Virginia	80,833	426	53	108	13	318	39	-------
COLORED								
Alabama	45,975	541	118	115	25	415	90	11
California	4,836	34	70	12	25	22	45	-------
Kentucky	7,721	85	110	38	49	46	60	1
Maryland	13,139	109	83	29	22	80	61	-------
Michigan	6,515	77	118	30	46	47	72	-------
Oklahoma	2,529	50	198	19	75	30	119	1
Virginia	33,868	341	100	92	27	248	73	1

[1] U.S. Bureau of the Census.

TABLE 16.—*All live births in the State, and deaths, mortality rate, and trimester of pregnancy among women dying from puerperal causes in urban and rural areas of each State included in the study*

State and area	Live births [1]	Women dying from puerperal causes						
		Total		Trimester of pregnancy				
				First two		Last		Not reported
		Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	
Total	**1, 176, 603**	**7, 380**	**63**	**2, 381**	**20**	**4, 965**	**42**	**34**
Alabama	130, 985	1, 118	85	242	18	859	66	17
California	83, 536	493	59	183	22	310	37	--------
Kentucky	121. 798	645	53	210	17	428	35	7
Maryland	64, 311	382	59	127	20	255	40	--------
Michigan	197, 975	1, 312	66	502	25	809	41	1
Minnesota	100, 422	491	49	154	15	334	33	3
Nebraska	55, 893	329	59	129	23	200	36	--------
New Hampshire	17, 474	109	62	30	17	79	45	--------
North Dakota	29, 673	159	54	53	18	106	36	--------
Oklahoma	42. 986	300	70	107	25	190	44	3
Oregon	28, 658	177	62	81	28	96	33	--------
Rhode Island	26, 747	165	62	52	19	113	42	--------
Virginia	114. 701	767	67	200	17	566	49	1
Washington	46. 476	316	68	146	31	169	36	1
Wisconsin	114. 968	617	54	165	14	451	39	1
URBAN								
Total	**461, 150**	**3. 462**	**75**	**1, 307**	**28**	**2, 148**	**47**	**7**
Alabama	22. 859	293	128	86	38	204	89	3
California	48, 559	298	61	119	25	179	37	--------
Kentucky	22, 866	153	67	61	27	90	39	2
Maryland	36, 486	257	70	94	26	163	45	--------
Michigan	120, 214	922	77	374	31	548	46	--------
Minnesota	38. 290	225	59	91	24	134	35	--------
Nebraska	13, 638	123	90	58	43	65	48	--------
New Hampshire	9, 095	54	59	13	14	41	45	--------
North Dakota	3, 954	31	78	12	30	19	48	--------
Oklahoma	8, 393	93	111	36	43	56	67	1
Oregon	11, 687	81	69	37	32	44	38	--------
Rhode Island	23, 031	157	68	48	21	109	47	--------
Virginia	25. 205	276	110	101	40	175	69	--------
Washington	24. 368	183	75	92	38	90	37	1
Wisconsin	52. 505	316	60	85	16	231	44	--------
RURAL								
Total	**715, 453**	**3, 918**	**55**	**1, 074**	**15**	**2, 817**	**39**	**27**
Alabama	108, 126	825	76	156	14	655	61	14
California	34, 977	195	56	64	18	131	37	--------
Kentucky	98, 932	492	50	149	15	338	34	5
Maryland	27, 825	125	45	33	12	92	33	--------
Michigan	77, 761	390	50	128	16	261	34	1
Minnesota	62, 132	266	43	63	10	200	32	3
Nebraska	42, 255	206	49	71	17	135	32	--------
New Hampshire	8. 379	55	66	17	20	38	45	--------
North Dakota	25, 719	128	50	41	16	87	34	--------
Oklahoma	34, 593	207	60	71	21	134	39	2
Oregon	16, 971	96	57	44	26	52	31	--------
Rhode Island	3, 716	8	22	4	11	4	11	--------
Virginia	89. 496	491	55	99	11	391	44	1
Washington	22, 108	133	60	54	24	79	36	--------
Wisconsin	62, 463	301	48	80	13	220	35	1

---

[1] U.S. Bureau of the Census.

LIVE BIRTHS AND STILLBIRTHS

The Bureau of the Census in its annual stillbirth statistics gives the caution that the completeness of registration is not known and that the term stillbirth is not used in the same sense in the different States, varying between the product of 7 or more months' utero-gestation and any product of conception. In this study the term stillbirth is used only of dead-born issue of the seventh month or later. This should be kept in mind in comparing the material from the present study with census material.

Only 3,091 (43 percent) of the 7,226 women dying from puerperal causes in the years and States of the study, for whom the type of issue was reported, gave birth to living children (table 17). In 32 of these cases the delivery was before the seventh month of gestation. Twenty percent were delivered of stillborn children (that is, dead-born issue of the seventh month or later); 29 percent had previable dead-born issue before the seventh month of gestation; and 8 percent died undelivered (chart IV).

TABLE 17.—*Result of pregnancy of white and colored women dying from puerperal causes*

Result of pregnancy	Women dying from puerperal causes					
	Total		White		Colored	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	7, 380	----------	6, 072	----------	1, 308	----------
Result of pregnancy reported	**7, 226**	**100**	**5, 976**	**100**	**1, 250**	**100**
Single pregnancy	*7, 054*	*98*	*5, 846*	*98*	*1, 208*	*97*
Live birth	[1] 2, 961	41	2, 525	42	436	35
Stillbirth	1, 415	20	1, 087	18	328	26
Previable [2]	2, 092	29	1, 801	30	291	23
Undelivered	586	8	433	7	153	12
Plural pregnancy	*172*	*2*	*130*	*2*	*42*	*3*
Both live births	[3] 97	1	[4] 84	1	13	1
Both stillbirths	21	(5)	[6] 11	(5)	[6] 10	1
One live birth, one stillbirth	33	(5)	23	(5)	[7] 10	1
Both previable [2]	16	(5)	10	(5)	6	(5)
Both undelivered	3	(5)	1	(5)	2	(5)
Not reported	2	(5)	1	(5)	1	(5)
Result of pregnancy not reported	**154**	----------	**96**	----------	**58**	----------

[1] Includes 31 before the last trimester.
[2] Born dead before the seventh month of gestation.
[3] Includes 1 before the last trimester.
[4] Includes 1 twin pregnancy resulting in 1 live birth and 1 fetus not delivered, and 1 case of triplets, all living.
[5] Less than 1 percent.
[6] Includes 1 case of triplets, all stillbirths.
[7] Includes 1 case of triplets—1 live birth and 2 stillbirths.

Among these women whose deaths were studied there were 47 stillbirths to every 100 live births. In 1927 in the birth-registration area 3.9 stillbirths were reported to every 100 live births, and in 1928, 4 stillbirths to every 100 live births.[6] These rates are for all mothers—those who lived as well as those who died. One would expect, of course, a higher stillbirth rate in a group such as the one studied, consisting entirely of mothers who died; even though previable fetuses are excluded from this group, the fetal mortality was more than 10 times as high in the group in which all the mothers died as it was in the birth-registration area.

---

[6] Birth, Stillbirth, and Infant Mortality Statistics, 1928, p. 18. U.S. Bureau of the Census. Washington, 1930.

In the present study, as in other published figures, the ratio of stillbirths to live births was higher among the colored women than among the white.

The risk of maternal death appears to be much greater in plural than in single pregnancies. In the group of women studied, all of whom died, the percentage of plural pregnancies was almost four times as large as it was in the 1928 birth-registration area for the group of mothers that included both those who died and those who survived. Among the 7,226 women in the study there were 172 (2 percent) with known plural pregnancies, including four cases of triplets. Of the 3,091 pregnancies resulting in at least one live birth, 130 (4 percent) were plural pregnancies. In the 1928 birth-registration area, 1 percent of the total pregnancies resulting in at least one live birth were plural pregnancies.[7]

CHART IV.—TYPE OF ISSUE AMONG WOMEN DYING FROM PUERPERAL CAUSES

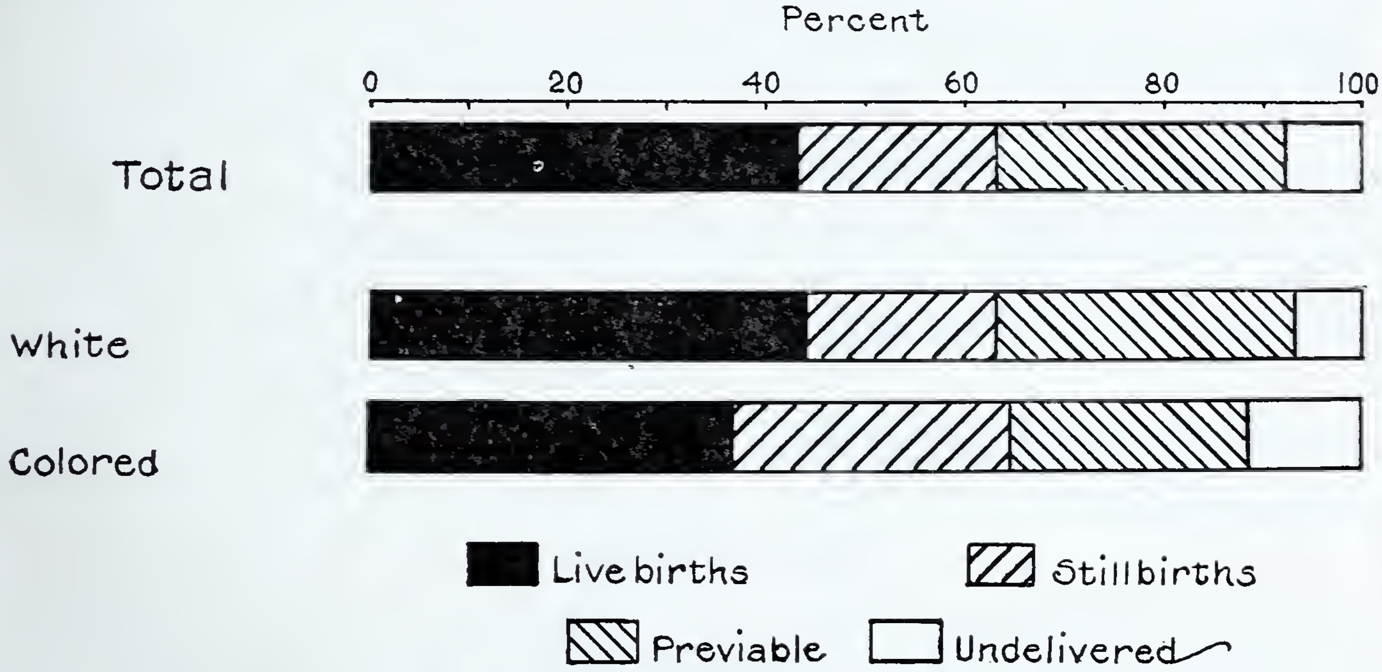


Table 18 shows live births and stillbirths to women dying from specified causes after they had reached the last trimester. As would be expected, the largest percentages of stillbirths are to those mothers who died of accidents of pregnancy, puerperal hemorrhage, other surgical operations and instrumental delivery, and puerperal albuminuria and convulsions. It is not known how many of the live-born infants died shortly after birth.

---

[7] Ibid., p. 10.

TABLE 18.—*Cause of death* [1] *as shown by interview and result of pregnancy of women dying from puerperal causes who had reached the last trimester of pregnancy*

Cause of death as shown by interview	Women dying from puerperal causes who had reached last trimester										
	Total	Result of pregnancy									
		Total reported	Live birth [2]		Stillbirth		Live birth and stillbirth (plural)		Undelivered		Not reported
			Number	Percent [3]	Number	Percent [3]	Number	Percent [3]	Number	Percent [3]	
All causes	**4,965**	**4,843**	**3,026**	**62**	**1,436**	**30**	**33**	**1**	**348**	**7**	**122**
Accidents of pregnancy	142	139	58	42	55	40	------	------	26	19	3
Puerperal hemorrhage	779	762	385	51	329	43	5	1	43	6	17
Other accidents of labor	651	630	391	62	209	33	1	(4)	29	5	21
Cesarean section	*135*	*133*	*106*	*80*	*27*	*20*	------	------	------	------	*2*
Other surgical operations and instrumental delivery	*109*	*109*	*38*	*35*	*66*	*61*	*1*	*1*	*4*	*4*	------
Others	*407*	*388*	*247*	*64*	*116*	*30*	------	------	*25*	*6*	*19*
Puerperal septicemia	1,529	1,488	1,128	76	342	23	8	1	10	1	41
Puerperal phlegmasia alba dolens, embolus, sudden death	291	288	236	82	42	15	1	(4)	9	3	3
Puerperal albuminuria and convulsions	1,549	1,513	807	53	457	30	18	1	231	15	36
Following childbirth (not otherwise defined)	22	21	19	------	2	------	------	------	------	------	1
Puerperal diseases of the breast	2	2	2	------	------	------	------	------	------	------	------

---

[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Includes 1 twin pregnancy resulting in 1 live birth and 1 fetus not delivered.
[3] Not shown where number is less than 50.
[4] Less than 1 percent.

PARITY AND AGE

Primiparae made one third, and multiparae two thirds, of the 6,854 women in the study for whom the number of pregnancies was reported. So little was known of 526 women by the persons signing the death certificates that it could not be determined whether they were primiparae or multiparae. Some of these death certificates were signed by coroners; others were those of women brought dying into hospitals. The exact number of pregnancies of 498 of those said to be multiparae was also unknown. Moreover, it is not likely that the order of birth as given by the physician was in all cases exact, as he may have been unaware of previous abortions in the patient's history. This statement applies with even greater force to the entries on birth certificates, on which the Bureau of the Census must base its data. The standard birth certificate contains inquiries concerning the total number of children, the number of children born alive and now living, the number born alive but now dead, and the number of stillbirths. Some abortions are probably included in stillbirths, but many are omitted.

For these reasons, and particularly on account of the large number of deaths of women for whom the number of pregnancies was unknown, maternal mortality rates according to parity are not presented.

The number of pregnancies of the women whose parity was not known probably was not similar to those of women whose parity was known, but included a larger proportion of multiparae. In the first place, there were many older women among those of unknown parity. Also, the deaths of more than half the women of unknown parity followed abortions, as compared with only one fourth of those of known parity. As a larger proportion of the deaths of known multiparae than of known primiparae followed abortions this also would indicate that more of the women of unknown parity were multiparae.

There was a larger proportion of primiparae and of women who had had 10 or more pregnancies among the colored women who died of puerperal causes than among the white women (table 19).

TABLE 19.—*Number of pregnancies of white and colored women dying from puerperal causes*

Number of pregnancies	Women dying from puerperal causes			
	White		Colored	
	Number	Percent distribution	Number	Percent distribution
Total	6,072		1,308	
Number of pregnancies reported	**5,688**	**100**	**1,166**	**100**
1	1,895	33	439	38
2	807	14	115	10
3	684	12	93	8
4	496	9	75	6
5	359	6	67	6
6	287	5	53	5
7	219	4	48	4
8	170	3	35	3
9	110	2	32	3
10 or more	278	5	94	8
Multiparae, number not specified	383	7	115	10
Number of pregnancies not reported	**384**		**142**	

This study shows, as do other published figures, that the risk of childbearing is great for mothers under 15 years of age, that the most favorable age is from 20 to 25 years, and that from that age onward the maternal mortality rate increases, reaching a maximum

TABLE 20.—*Number of deaths and mortality rate among white and colored women dying in specified age periods from puerperal causes*

Age period	Women dying from puerperal causes					
	Total		White		Colored	
	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10.000 live births
Total	7,380	63	6,072	57	1,308	109
Under 15 years	25	161	6	81	19	235
15 years, under 20	855	60	605	52	250	100
20 years, under 25	1,545	46	1,264	42	281	79
25 years, under 30	1,537	52	1,295	48	242	95
30 years, under 35	1,412	67	1,211	63	201	123
35 years, under 40	1,312	97	1,114	90	198	168
40 years, under 45	570	121	482	111	88	240
45 years and over	94	203	79	195	15	254
Not reported	30	73	16	55	14	117

in the age period 45 years and over (table 20). This is true both for white and for colored women. The maternal mortality rates at each age are much higher for colored than for white women. Among the colored women the maternal mortality rate for the very young is nearly as high as for the oldest mothers. The colored rate increases less after 40 years than the white.

One reason for the high mortality of the youngest mothers is that 19 of the 25 girls under 15 and more than one fourth of the 855 between 15 and 20 were single. The maternal mortality among single women was much higher than among married women. (See p. 38.)

The relationships of age and parity to the different causes of death and to other factors in the maternal-mortality study will be discussed in the sections on those factors. (See also appendix tables VII and VIII, pp. 191, 192.)

ILLEGITIMACY

The deaths of 509 unmarried women are included in the study. Approximately half (51 percent) died of puerperal septicemia, as compared with 39 percent among the married women, and of the deaths from septicemia among the unmarried almost two thirds (63 percent) occurred before the women had reached the last trimester. Puerperal albuminuria and convulsions, also, caused a larger proportion of the deaths of unmarried than of married women (table 21).

TABLE 21.—*Cause of death [1] as shown by interview, among married and unmarried women dying from puerperal causes*

Cause of death as shown by interview [1]	Women dying from puerperal causes					
	Total	Married		Unmarried		Marital status not reported
		Number	Percent distribution	Number	Percent distribution	
All causes	7,380	6,850	100	509	100	21
Accidents of pregnancy	719	682	10	35	7	2
Puerperal hemorrhage	791	771	11	17	3	3
Other accidents of labor	652	623	9	26	5	3
Puerperal septicemia	2,948	2,680	39	258	51	10
Puerperal phlegmasia alba dolens, embolus, sudden death	344	335	5	9	2	
Puerperal albuminuria and convulsions	1,900	1,736	25	161	32	3
Following childbirth (not otherwise defined)	23	21	(2)	2	(2)	
Puerperal diseases of the breast	3	2	(2)	1	(2)	

[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Less than 1 percent.

More than half (263) of the 509 unmarried women were colored, as compared with 18 percent colored in the entire study.

Of the women for whom parity was reported primiparae made up 85 percent of the 474 who were unmarried and only 30 percent of the 6,366 who were married.

The single women were a much younger group than the married women. Fifty-two percent of the single women and only 10 percent of the married women were under 20 years of age (table 22).

Of the 506 unmarried women for whom the period of gestation was reported, 219 (43 percent) died before reaching the last trimester, as compared with 2,152 (32 percent) of the 6,819 married women for whom this was reported. This larger proportion of early terminations of pregnancy among the unmarried women who died was confined, however, to the white women, among whom 60 percent of the unmarried and 32 percent of the married died before the last trimester of pregnancy; in the corresponding colored group the percentages were 28 for the unmarried and 27 for the married women.

The deaths of 186 unmarried women followed abortion; 129 of them were reported to have been induced abortions. (See p. 108.)

TABLE 22.—*Number of deaths of married and unmarried women dying in specified age periods from puerperal causes*

Age period	Women dying from puerperal causes					
	Total	Married		Unmarried		Marital status not reported
		Number	Percent distribution	Number	Percent distribution	
Total	7,380	6,850		509		21
Age reported	**7,350**	**6,826**	**100**	**505**	**100**	**19**
Under 15 years	25	6	(1)	19	4	
15 years, under 20	855	609	9	242	48	4
20 years, under 25	1,545	1,393	20	147	29	5
25 years, under 30	1,537	1,475	22	54	11	8
30 years, under 35	1,412	1,388	20	23	5	1
35 years, under 40	1,312	1,298	19	13	3	1
40 years, under 45	570	564	8	6	1	
45 years and over	94	93	1	1	(1)	
Age not reported	**30**	**24**		**4**		**2**

(1) Less than 1 percent.

Few of the unmarried women had had any prenatal care. One hundred and forty-four deaths, made up of those that followed induced abortion and those that occurred after pregnancies of 2 months' duration or less, were excluded from consideration in this regard.[8] Of the 324 deaths of women for whom there was a report as to prenatal care, 238 (73 percent) had had none whatever. Only 10 (3 percent) had had adequate or good care (grade I), 21 (6 percent) had had indifferent care (grade II), and 54 (17 percent) had had very inadequate care (grade III). There was less prenatal care among the colored than among the white women and less among those who died in the rural areas than among those who died in cities of 10,000 or more population. (See appendix table IX, p. 195.)

There was practically no difference in the hospitalization of the unmarried women and of the total group. (See appendix table X, p. 195.)

Of the 509 unmarried women 25 (5 percent) had had no medical attention and 66 (13 percent) had had medical attention only when they were dying; thus 18 percent of the unmarried women, as compared with only 9 percent of the total group, had had medical attention only when dying or not at all.

The large proportion of induced abortions, lack of prenatal care, and lack of medical attention, as well as other factors, would tend to cause a higher maternal mortality rate among unmarried than among married women. Live births were recorded as legitimate or illegitimate in all the States included in the study except California. The maternal mortality rate for unmarried mothers in all the States combined, exclusive of California, was 143 per 10,000 illegitimate live births; for married mothers it was 60 per 10,000 legitimate live births. The maternal mortality rate for white unmarried mothers was 137, for colored 149, for urban 162, and for rural 129—all much higher than the corresponding maternal mortality rates for the entire group of mothers. (A number of deaths of married, widowed, or divorced women associated with pregnancies thought to have been illegitimate are included with those of married, rather than unmarried mothers.)

---

[8] For criteria as to care and for care obtained by the entire group of women in the study see pp. 40–55.

COMMENT BY ADVISORY COMMITTEE

This study apparently represents a fair sampling of maternal deaths throughout the registration area.

In this study the International List of Causes of Death together with the Manual of Joint Causes in use by the United States Bureau of the Census has been used as the chief basis of classification. While this procedure was not entirely satisfactory from a medical point of view, the inherent disadvantages seemed counterbalanced by the fact that it provides a definite and understandable classification and that its use would assist the comparison of the findings with those of other investigators.

Certain changes in classification resulted after the interviews. These alterations, which were made necessary by various causes, emphasize the dependence of the official statistics on the original death certificate and the apparent unavoidability of a small percentage of error. A relatively small number of cases were excluded as nonpuerperal. These cases are easily equaled or exceeded by those that were actually puerperal but that were classed in the vital statistics as nonpuerperal and so were not included in the study. Therefore, maternal mortality rates as given in this study are probably *lower* than the actual rates.

Autopsies were held in less than 8 percent of the cases, and many of the autopsies were done by coroners simply to determine the cause of death. It is apparent that there was gross lack of scientific study of the puerperal deaths included in the study.

The exceedingly high death rate among colored mothers is especially challenging when considered in connection with the poor maternal care that was received by these colored women, as will be shown in succeeding sections.

The differences between urban and rural rates cannot be fully explained by this study, as complete information on residence is not available. It is apparent, however, that two of the factors contributing to the higher urban rates are the larger proportion of abortions in the urban than in the rural communities and the deaths in urban hospitals of women who were delivered in rural areas. The exact value of the second factor cannot be determined from this study for reasons given in the report.

Nine percent of the women had no medical attention whatsoever, or else had attention only when they were actually dying. Only part of this was due to physical inaccessibility. Inaccessibility due to distance and bad roads, however, was a serious problem in certain localities of the States studied. The part played by inaccessibility in the lack of *early*, as distinguished from *any*, medical attention was not measured; but the larger proportion of deaths from hemorrhage and the toxemias in the less accessible groups is suggestive, especially when considered in conjunction with the lack of prenatal care among women who died in the rural areas.

It is impossible to draw conclusions as to the relative safety of deliveries in hospitals and homes from a study of deaths alone. Data regarding the total number of deliveries in hospitals and homes were lacking. Many hospital deaths followed home deliveries, and many of the hospital deliveries were emergency cases. However, there were too many deaths (899) of women who had planned hospital deliveries in the last trimester.

The figures relative to still births and live births indicate strikingly the appalling loss of fetal life associated with maternal deaths; 37 percent were either undelivered or previable infants, 20 percent were of viable age but stillborn, and only 43 percent are credited as being live births. The number of these infants who died or were damaged survivors was not possible to determine from this investigation.

One third of all the deaths were of women who had not reached the last trimester of pregnancy. Duration of pregnancy is a most important consideration in the evaluation of any statistics on maternal mortality.

Illegitimacy contributes to maternal mortality, as 7 percent of the deaths in this study were of unmarried women, and the mortality rate is much higher for unmarried than for married mothers. There was a larger proportion of abortions among the unmarried, and the deaths from such preventable causes as sepsis and toxemia were relatively more numerous among the unmarried mothers. Social and economic factors doubtless play an important role in creating this mortality and they should be adjusted to prevent this loss of life.

MATERNAL CARE

In the study of a series of maternal deaths it is obvious that the type of care received by the women who died should have primary attention. In its fullest sense maternal care includes many factors—the woman's food, her living conditions as regard housing, sanitation, clothing, work, and exercise; whether she had been comparatively calm and happy or had had many worries; under what conditions her confinement took place and how she spent the lying-in period; and, of particular importance, what type of medical and nursing care she had. In this study attention was confined largely to the medical aspects of maternal care.

All the cases in the present study were eventually abnormal, for all these women died. The details of the care given them were frequently determined by that abnormality. This was often true of the prenatal care received by these women, but it was true of their delivery care in more cases and of their postpartum care in still more cases. Considerable general discussion of prenatal care is possible, but much of the discussion of delivery care must be included in the sections on operations and on the various causes of death; and postpartum care, because it varied greatly with the different abnormalities that were found, will have to be discussed almost entirely in the sections dealing with the individual causes of death.

Of the 7,380 women whose deaths were included in the study, only 933 were known to have had no complication of pregnancy before delivery. Six hundred and sixteen of these 933 were reported to have had no intercurrent disease, only 263 of the 616 were known to have had normal spontaneous deliveries in the last trimester, and only 199 of the 263 were reported to have had a normal third stage of labor and no postpartum hemorrhage. These 199 deaths were classified, according to the International List of Causes of Death, as follows: Puerperal sepsis, 100; phlegmasia alba dolens, embolus, sudden death, 55; other accidents of labor, 23; puerperal albuminuria and convulsions, 15; other puerperal causes, 6. It should be borne in mind in connection with these figures that a large number of women who had had no prenatal care or about whose care during pregnancy nothing was known were for obvious reasons not included in them.

PRENATAL CARE

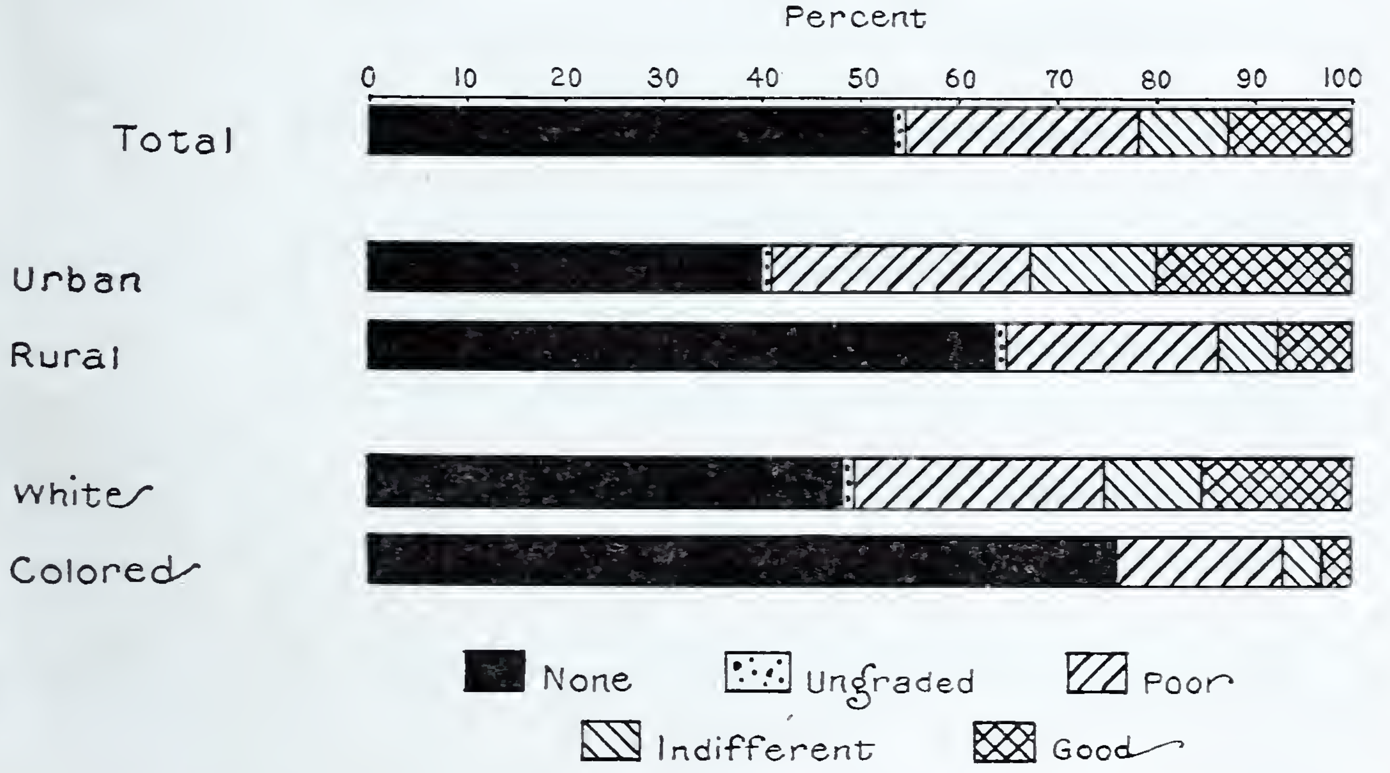
It is agreed that many maternal deaths may be prevented by adequate medical supervision during pregnancy. The records of many clinics show that the severity of the toxemias of pregnancy has been much reduced and that deaths from this cause are comparatively rare among those patients who have had adequate prenatal care—particularly if this is combined with adequate care at and after delivery. Other complications accidental and incidental to pregnancy have been prevented or have been detected early, and patients have been put in better condition to withstand them.

It is primarily in such records that evidence as to the value of prenatal care should be sought. The case histories in this study are all records of deaths, and so, of failures. A number of women died in spite of excellent prenatal care; but many more women who had inadequate care or no prenatal care at all would in all probability have been saved by early recognition and intelligent treatment of their symptoms. It is obvious that not only prenatal care but continuous prenatal, intrapartum, and postpartum care is necessary to prevent these deaths. The best prenatal care cannot offset faulty technique or poor judgment at delivery.

THE GROUP FOR WHOM REPORT AS TO PRENATAL CARE WAS RECEIVED

All pregnant women should receive prenatal care. In practice prenatal care is seldom sought before the third month of pregnancy, for many women are not aware of their need before that time. Also it is not sought by women who are sufficiently hostile to their pregnancy to resort to self-induced or criminal abortions. As 1,154 of the 7,380 women in this mortality group had pregnancies that terminated before the third month or were terminated intentionally, there remained 6,226 to whom it might be expected that prenatal care would have been given.

CHART V.—PRENATAL CARE AMONG WOMEN DYING FROM PUERPERAL CAUSES[1]



A report as to prenatal care could be obtained, however, concerning only 5,636 of the 6,226 women who might have been expected to have such care. These 5,636 women, therefore, constituted the group studied with reference to prenatal care.

LARGE PROPORTION OF WOMEN WITHOUT PRENATAL CARE

Of these 5,636 women 3,025 (54 percent) had had no prenatal examination by a physician. For the most part, physicians had no opportunity to give prenatal care to these women, for they were not consulted. A few of the women undoubtedly had engaged a physician for their confinement, and a few probably had seen a physician during their pregnancy for some intercurrent disease; but none had had any examination or any advice from a physician regarding their pregnancy.

---

[1] Excludes women for whom pregnancy terminated before the third month and women who had induced abortions.

Prenatal care was much more frequent among the white than among the colored women. Nearly half (48 percent) of the 4,568 white women for whom information as to prenatal care was obtained had had no prenatal care, as compared with about three fourths (76 percent) of the 1,068 colored. In both groups care was much more frequent among those dying in urban districts than in rural. Thirty-six percent of the white women in urban districts, as compared with 59 percent in rural districts, had had no prenatal care, and 63 percent of the colored women in urban districts had had no care, as compared with 83 percent in rural districts (table 23 and chart V).

TABLE 23.—*Prenatal care received by white and colored women dying in urban and rural areas from puerperal causes*

Grade of prenantal care	Women dying from puerperal causes					
	Total		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	7,380	----------	3,462	----------	3,918	----------
Report on prenatal care	**5,636**	**100**	**2,452**	**100**	**3,184**	**100**
Grade I	725	13	484	20	241	8
Grade II	499	9	320	13	179	6
Grade III	1,337	24	630	26	707	22
Ungraded	50	1	32	1	18	1
None	3,025	54	986	40	2,039	64
No report on prenatal care	**590**	----------	**313**	----------	**277**	----------
Inapplicable [1]	**1,154**	----------	**697**	----------	**457**	----------
WHITE						
Total	6,072	----------	2,951	----------	3,121	----------
Report on prenatal care	**4,568**	**100**	**2,061**	**100**	**2,507**	**100**
Grade I	694	15	463	22	231	9
Grade II	458	10	291	14	167	7
Grade III	1,157	25	540	26	617	25
Ungraded	45	1	28	1	17	1
None	2,214	48	739	36	1,475	59
No report on prenatal care	**458**	----------	**246**	----------	**212**	----------
Inapplicable [1]	**1,046**	----------	**644**	----------	**402**	----------
COLORED						
Total	1,308	----------	511	----------	797	----------
Report on prenatal care	**1,068**	**100**	**391**	**100**	**677**	**100**
Grade I	31	3	21	5	10	1
Grade II	41	4	29	7	12	2
Grade III	180	17	90	23	90	13
Ungraded	5	(2)	4	1	1	(2)
None	811	76	247	63	564	83
No report on prenatal care	**132**	----------	**67**	----------	**65**	----------
Inapplicable [1]	**108**	----------	**53**	----------	**55**	----------

[1] Induced abortions and cases in which pregnancy terminated before the third month.

[2] Less than 1 percent.

GRADING OF THE PRENATAL CARE RECEIVED

The grading of the prenatal care received by the 2,611 women who had examinations during their pregnancy was based more on the need for a practical way of classifying the cases than on consideration of what constitutes ideal care. Account was taken of the period of pregnancy at which supervision began, of examinations that were made, and of the regularity of the examinations. The duration of the care as it was affected by early terminations of pregnancy was not considered, so that "good" care does not always mean long care. Neither was there an evaluation of treatment, as methods of treatment are not so standardized as methods of examination. The classification "good" prenatal care, therefore, does not necessarily include treatment that would be accepted by a majority of obstetricians as good.

The prenatal care given was classified as follows for statistical purposes:

Grade Ia.—Only 42 (less than 1 percent) of the 5,636 women for whom prenatal care was reported and applicable had had examinations as described in Standards of Prenatal Care (Children's Bureau Publication No. 153). This has been designated as grade Ia care and is the only grade of care that can be accepted as *adequate.*

Care of grade Ia may be defined as follows: (1) A careful history, medical, surgical, gynecological, and obstetric; (2) a complete physical examination, including the examination of heart, lungs, and abdomen; (3) pelvic measurements, both internal and external; (4) the taking of blood for a Wassermann reaction;[2] (5) minute instructions in the hygiene of pregnancy; and (6) visits to a physician at least once a month during the first 6 months, then oftener as indicated. (In the cases graded as Ia in this study the first visit must have taken place not later than the end of the second month.) At each of the visits the patient's general condition was to be investigated; blood pressure, urinalysis, pulse, and temperature recorded; weight of the patient taken if possible; abdominal examination made, and the height of the fundus determined.

Grade Ib.—Another 683 women (12 percent) of the 5,636 for whom prenatal care was reported and applicable had had care that may be classified as *good,* although not up to the highest standards. This is designated as grade Ib care. In the tables, grades Ia and Ib are grouped together as grade I.

Care of grade Ib consisted of at least: (1) A general physical examination, including examination of heart, lungs, and abdomen; (2) pelvic measurements, external and internal, except in pregnancies terminating before the eighth month and for multiparae who had had a previous normal delivery; (3) regular monthly visits to a physician beginning with or before the fifth month, with examination of urine and blood pressure at each visit.

Grade II.—Four hundred and ninety-nine women (9 percent) of the 5,636 had had prenatal care that did not fulfill the requirements of grade I but that was classed as grade II. It can only be regarded as *indifferent* prenatal care.

Care of grade II consisted of at least: (1) A general physical examination, including examination of heart, lungs, and abdomen; and (2) regular monthly visits to a physician beginning not later than the seventh month, with examination of urine and blood pressure at each visit.

Grade III.—The largest group of those who had had any prenatal care consisted of 1,337 women (24 percent of the 5,636 women studied with regard to prenatal care) whose care did not even meet the requirements of grade II and had to be classified as grade III. In all cases this care was very inadequate and must be regarded as *poor*.

---

[2] The advisory committee has added the taking of blood counts to the Standards of Prenatal Care, but this was not considered in this study.

Care classified as grade III: In some cases there was a single visit to the physician; in some cases there were repeated visits but blood pressure was not taken, or some other essential of a better grade of care was omitted; in other cases the visits were irregular; and in still other cases the care was of good quality but did not begin until the eighth or ninth month.

The remaining 50 women had had some prenatal care, which was not graded because information regarding it was insufficient.

To summarize: *Less than one fourth of the women who could reasonably be expected to have had prenatal care had had good or even indifferent care. More than three fourths had had poor care or none at all. The grading of the care, moreover, was made on the basis of examinations only and not of treatment.*

The type of prenatal care that could be given depended on the promptness with which the pregnant woman presented herself to the physician. Those patients who appeared before or during the fifth month of pregnancy were eligible, if they returned regularly, for grade I prenatal care, and 1,478 women—more than half of the 2,611 women who had some prenatal care—consulted the physician before or during the fifth month. Of these, only 725 (49 percent) received grade I care, 243 (16 percent) received grade II care, and 501 (34 percent) received grade III care; for 9 the grade was not reported. Five hundred and eighty-one women first appeared during the sixth or the seventh month, and so were eligible for grade II prenatal care; 253 (44 percent) received grade II care; and 327 (56 percent) received grade III care; for 1 the grade was not reported. (Three women receiving grade II care visited the physician before the seventh month, but the exact month was not reported.)

Care of the better grades was more frequent among the white than among the colored, 25 percent of the white women having received care of grade I or grade II, as compared with 7 percent of the colored. In urban districts 37 percent of the white women had had grade I or grade II care, as compared with 16 percent in the rural districts. Among the colored 13 percent in urban districts had had grade I or grade II care, as compared with 3 percent in the rural.

FREQUENCY OF VARIOUS ELEMENTS OF PRENATAL CARE

The element of prenatal care that was most frequently lacking was the Wassermann test. Of the 2,611 women who had had some prenatal care, 427 (16 percent) were known to have had this examination. The 352 white women who had had Wassermann tests were only 15 percent of the 2,354 white women who had had some prenatal care. The 75 colored women were 29 percent of the 257 colored who had had some prenatal care. Wassermann tests had been done much more frequently in cases of women who died in urban districts (24 percent) than in rural districts (6 percent). Twenty-two percent of the urban white women who had care had Wassermann tests, as compared with 6 percent of the rural white, 47 percent of the urban colored, and 7 percent of the rural colored. The higher frequency of the Wassermann test among the urban colored as compared with the urban white is probably due to the more frequent use of clinic facilities by the colored (table 24).

TABLE 24.—*Incidence of specified tests among white and colored women who had received prenatal care dying in urban and rural areas from puerperal causes*

Color and area	Women dying from puerperal causes who had received prenatal care										
	Total	Specified tests reported									
		Wassermann		Blood pressure		Pelvic measurements					
						Total		External and internal		External only	
		Number	Percent	Number	Per cent	Number	Percent	Number	Percent	Number	Percent
Total	**2,611**	**427**	**16**	**2,054**	**79**	**1,139**	**44**	**618**	**24**	**521**	**20**
White	2,354	352	15	1,893	80	1,054	45	564	24	490	21
Colored	257	75	29	161	63	85	33	54	21	31	12
Urban	*1,466*	*357*	*24*	*1,241*	*85*	*816*	*56*	*470*	*32*	*346*	*24*
White	1,322	290	22	1,136	86	740	56	421	32	319	24
Colored	144	67	47	105	73	76	53	49	34	27	19
Rural	*1,145*	*70*	*6*	*813*	*71*	*323*	*28*	*148*	*13*	*175*	*15*
White	1,032	62	6	757	73	314	30	143	14	171	17
Colored	113	8	7	56	50	9	8	5	4	4	4

In connection with the study of the frequency of the Wassermann test it must be remembered that if syphilis had been certified in company with any puerperal cause, the death would have been classified by the Bureau of the Census as nonpuerperal, in accordance with the International List of Causes of Death.

Pelvic measurements were reported for 1,139 women; but while 618 of these were known to have had both internal and external measurements, only external measurements were reported for the other 521. Pelvic measurements had been taken in the cases of 56 percent of the urban white, 30 percent of the rural white, 53 percent of the urban colored, and 8 percent of the rural colored who had had some prenatal care.

Among those who had had some prenatal care the blood pressure was usually taken. This, however, was more usual in urban districts (85 percent) than in rural districts (71 percent). Blood pressure had been taken at least once in 86 percent of the urban white, 73 percent of the rural white, 73 percent of the urban colored, and 50 percent of the rural colored cases in which there had been some prenatal care.

At least one urinalysis was included in the prenatal care of practically all these women.

GRADE OF PRENATAL CARE, CAUSE OF DEATH, AND PERIOD OF GESTATION

The prenatal care received by these women is best shown by giving the grades and the causes of deaths separately for those whose pregnancies lasted until the seventh month or later and for those who died earlier in pregnancy (table 25).

Prenatal care of women dying before they reached the last trimester

In more than half (55 percent) of the cases of women dying before they reached the last trimester the women died too early to have been

TABLE 25.—*Cause of death* [1] *as shown by interview, grade of prenatal care, and trimester of pregnancy among women dying from puerperal causes*

Trimester of pregnancy and cause of death[1] as shown by interview	Women dying from puerperal causes													
	Total	Who had received prenatal care									Who had received no prenatal care		No report on prenatal care	Inapplicable[2]
		Total		Grade I		Grade II		Grade III		Ungraded				
		Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution		Number	Percent distribution		
Total	7,380	2,611	----	725	----	499	----	1,337	----	50	3,025	----	590	1,154
Last trimester	**4,965**	**2,245**	**100**	**542**	**100**	**472**	**100**	**1,190**	**100**	[3] **41**	**2,325**	**100**	**395**	----
Accidents of pregnancy	142	65	3	12	2	10	2	42	4	1	62	3	15	----
Puerperal hemorrhage	779	336	15	98	18	58	12	171	14	9	393	17	50	----
Other accidents of labor	651	334	15	79	15	80	17	168	14	7	262	11	55	----
Puerperal septicemia	1,529	633	28	155	29	137	29	331	28	10	727	31	169	----
Puerperal phlegmasia alba dolens, embolus, sudden death	291	183	8	67	12	39	8	74	6	3	89	4	19	----
Puerperal albuminuria and convulsions	1,549	680	30	130	24	144	31	396	33	10	786	34	83	----
Following childbirth (not otherwise defined)	22	13	1	1	(4)	(4)	1	7	1	1	6	(4)	3	----
Puerperal diseases of the breast	2	1	(4)	----	----	----	----	1	(4)	----	----	----	1	----
First 2 trimesters	**2,381**	**366**	**100**	**183**	**100**	**27**	(3)	**147**	**100**	[3] **9**	**698**	**100**	**163**	**1,154**
Accidents of pregnancy	575	113	31	56	31	5	----	49	33	3	192	28	38	232
Puerperal hemorrhage	11	2	1	----	----	----	----	2	1	----	7	1	2	----
Other accidents of labor	1	1	(4)	----	----	1	----	----	----	----	----	----	----	----
Puerperal septicemia	1,403	64	17	36	20	5	----	21	14	2	363	52	90	886
Puerperal phlegmasia alba dolens, embolus, sudden death	53	12	3	3	2	1	----	8	5	----	20	3	2	19
Puerperal albuminuria and convulsions	338	174	48	88	48	15	----	67	46	4	116	17	31	17
Trimester not reported	**34**	----	----	----	----	----	----	----	----	----	**2**	----	**32**	----

---

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Induced abortions and cases in which pregnancy terminated before the third month.

[3] Percent distribution not shown because number of women was less than 50.

[4] Less than 1 percent.

expected to have care or they had had induced abortions or else a report was not obtained concerning prenatal care. Most of these deaths were from puerperal septicemia or from ectopic gestation.

Of the 1,064 women for whom care was applicable and for whom a report was obtained, 17 percent had received care that could be classified as grade I, but the duration of this care was not necessarily long. Three percent had had grade II care, and 14 percent had had grade III care. For 1 percent care was reported but in insufficient detail for grading. Sixty-six percent had received no care whatsoever.

Differences in the incidence of the various causes of death among the women who died before reaching the last trimester and who had had the various grades of care are not outstanding, but such differences are striking when those who had received care are compared with those who had received no care.

Of the deaths before the last trimester of the women who had had prenatal care 48 percent are attributed to puerperal albuminuria and convulsions, which includes the toxemias of pregnancy, and 14 percent more are classified as "others" (meaning others than abortions and ectopic gestation, or chiefly pernicious vomiting) under the title "accidents of pregnancy." Among the group having had no prenatal care 17 percent died from albuminuria and 3 percent from "others" under accidents of pregnancy. That is, 62 percent of the deaths of those who had had prenatal care and 20 percent of the deaths of those who had had no prenatal care were due to the toxemias. Evidently many of the women who had had prenatal care consulted their physicians early in pregnancy because of troublesome symptoms. Many of these women, as the discussion in the section on the toxemias of pregnancy (p. 144) reveals, were, in fact, in very bad condition when they first saw their physicians.

On the other hand, 17 percent of those who had had prenatal care, as compared with 52 percent of those who had had no prenatal care, died of puerperal septicemia. Nearly all this septicemia followed abortions. Most of these abortions were reported to have been spontaneous; but some were therapeutic, and some (other than therapeutic) were probably induced, although there was no clear evidence of this fact. (Prenatal care was not considered in cases of known induced abortions.)

Prenatal care of women who died after reaching the last trimester

Of the 4,570 women who died after reaching the last trimester and for whom a report was obtained concerning prenatal care, 12 percent had had grade I, adequate or good care (including 33 women (1 percent) with grade Ia, or adequate care); 10 percent had had grade II, or indifferent care; 26 percent had had grade III, or poor care; 1 percent had had care that could not be graded on account of insufficient information; and 51 percent had had no prenatal care.

In this group the differences in the incidence of the various causes of death among women who had had some prenatal care and those who had had none are not so marked as among those who died before reaching the seventh month. Thirty percent of those who died after having had some prenatal care, as compared with 34 percent of those who had had no prenatal care, died of puerperal albuminuria and convulsions; 28 percent of those with care and 31 percent of those without care died of puerperal sepsis; 15 percent of those with care and 17 percent of those without prenatal care died of puerperal hemorrhage; 15 percent of those with care and 11 percent of those without care died of "other accidents of labor"; 8 percent of those with care and 4 percent of those without care died of "embolus or sudden death"; and 3 percent of each died of accidents of pregnancy. These differences are small but significant, in that a larger proportion of those who died following prenatal care died of causes that are relatively less preventable.

Differences in the causes of death of those who had grade I prenatal care and of those who had no prenatal care, are much more marked, as would be expected. The differences in the proportions of the deaths that were due to puerperal albuminuria and convulsions are particularly significant, as are to a lesser extent the differences in the proportions due to puerperal embolism and sudden death.

The percentage of deaths due to puerperal albuminuria and convulsions was considerably less among those who died following good care than among those who died following care of poorer quality or no care whatsoever. Twenty-four percent of those who died following grade I care, 31 percent of those who had had grade II care, 33 percent of those who died following grade III care, and 34 percent of those who had had no prenatal care died from this cause. Evidently, care of grade I was the only quality that was particularly effective in preventing such deaths. Why grade I care did not succeed further in preventing deaths from puerperal albuminuria and convulsions will be discussed in the section on the toxemias (p. 139). There is a direct relationship between the grade of prenatal care and the proportion of deaths due to puerperal embolism and sudden death, which accounted for 12 percent of the deaths of those who had had grade I care, 8 percent of those who had had grade II care, 6 percent of those who had had grade III care, and 4 percent of those who had had no care at all. This is not because there are more operations among those with grade I care, for deaths from embolism following operation are usually assigned to these operations as the cause of death. It is therefore apparent from table 25 that among these women the better the prenatal care the more frequently the deaths were due to the less preventable causes. The maternal death rate evidently is less among mothers having good prenatal care than among those having poor care or none.

PRENATAL CARE AND NUMBER OF PREGNANCIES

As the risk of childbearing is probably greater during the first pregnancy than for the five or six subsequent ones, and as eclampsia affects primigravidae more than multigravidae, it would seem especially essential for primigravidae to have prenatal care. Of the 2,334 known primiparae whose deaths were included in the maternal-mortality study, prenatal care was reported and applicable for 1,924. Of these, 14 percent had had grade I, adequate or good prenatal care; 14 percent had had grade II, indifferent prenatal care; 24 percent had had grade III, poor prenatal care; and 46 percent had had no prenatal care. Twenty-two percent of mothers in their second pregnancy and 18 percent of those in their third pregnancy had had good prenatal care. After the second pregnancy the amount of good prenatal care decreased with the number of pregnancies. Eleven percent of the secundiparae and 6 percent of the triparae had had indifferent prenatal care; and 27 percent of each had had poor care. Thirty-nine percent of the secundiparae and 48 percent of the triparae had had no prenatal care. *After the second pregnancy the percentages of those who had had no prenatal care rose with the number of pregnancies.* This trend was more pronounced than could be accounted for by the facts that there was a greater proportion of colored among the mothers with the larger number of children and that the colored had less and poorer prenatal care. Apparently more attention needs to be paid to reaching for prenatal care these two groups of mothers, who are particularly hard to reach—the primiparae and the mothers of many children (table 26).

TABLE 26.—*Number of pregnancies of women for whom a report on prenatal care was obtained and applicable*[1] *among women dying from puerperal causes*

Number of pregnancies	Women dying from puerperal causes for whom a report on prenatal care was obtained and applicable[1]											
	Total	Who had received prenatal care										Who had received no prenatal care	
		Total	Percent	Grade I		Grade II		Grade III		Ungraded			
				Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	5, 636	2, 611	46	725	13	499	9	1, 337	24	50	1	3, 025	54
1	1, 924	1, 038	54	274	14	274	14	470	24	20	1	886	46
2	717	439	61	157	22	78	11	195	27	9	1	278	39
3	602	312	52	109	18	39	6	162	27	2	(2)	290	48
4	430	181	42	53	12	29	7	95	22	4	1	249	58
5	339	154	45	41	12	15	4	94	28	4	1	185	55
6	276	109	39	31	11	11	4	64	23	3	1	167	61
7 or more	844	287	34	43	5	41	5	200	24	3	(2)	557	66
Multiparae, number not reported	302	63	21	12	4	7	2	41	14	3	1	239	79
Not reported	202	28	14	5	2	5	2	16	8	2	1	174	86

[1] Excludes induced abortions and cases in which pregnancy terminated before the third month.
[2] Less than 1 percent.

PRENATAL CARE IN RELATION TO LIVE BIRTHS AND STILLBIRTHS

In many cases the condition that caused the death of the mother also caused the death of the child, and this distorted the proportions of live births, stillbirths, and undelivered fetuses. Nevertheless, there appears a relationship between the grade of prenatal care and the percentage of live births. Among the 4,843 women who died after reaching the last trimester and for whom there was a report on the character of issue, 70 percent were live births for the mothers who had had grade I care and grade II care, 63 percent for those who had had grade III care, and 58 percent for those who had had no care (table 27).

TABLE 27.—*Prenatal care received and result of pregnancy among women dying from puerperal causes who had reached the last trimester of pregnancy*

Grade of prenatal care	Women dying from puerperal causes who had reached last trimester										
	Total	Result of pregnancy reported									Result of pregnancy not reported
		Total	Live birth[1]		Stillbirth		Live birth and stillbirth (plural)		Fetus not delivered		
			Number	Percent[2]	Number	Percent[2]	Number	Percent[2]	Number	Percent[2]	
Total	4,965	4,843	3,026	62	1,436	30	33	1	348	7	122
Grade I	542	542	379	70	141	26	2	(3)	20	4	------
Grade II	472	470	330	70	115	24	1	(3)	24	5	2
Grade III	1,190	1,178	740	63	350	30	8	1	80	7	12
Ungraded	41	41	25	------	14	------	------	------	2	------	------
No prenatal care	2,325	2,280	1,332	58	719	32	22	1	207	9	45
No report on prenatal care	395	332	220	66	97	29	------	------	15	5	63

[1] Includes 1 twin pregnancy resulting in 1 live birth and 1 fetus not delivered.
[2] Not shown where number of women was less than 50.
[3] Less than 1 percent.

PRENATAL CARE IN THE DIFFERENT STATES

The quality and amount of prenatal care given varied greatly in the different States included in the study. Of the women who might have been expected to have prenatal care 71 percent in Oregon and 70 percent in Rhode Island had had some care, but only 22 percent in Alabama and 30 percent in Oklahoma. The percentage of deaths that had been preceded by grade I prenatal care ranged from 26 in Washington to 4 in Alabama.

As fewer colored women than white had received prenatal care, the large proportion of colored women among those who died in Alabama, Virginia, and Maryland lowered perceptibly the percentages of those who had received the various grades of prenatal care in these States. The prenatal care received by the white and colored women in these States is shown in table 28.

In every State except one more of the women who died in cities than of those who died in the rural areas had had prenatal care (table 29).

TABLE 28.—*Prenatal care received by white and colored women for whom a report was obtained and applicable*[1] *among women dying from puerperal causes in all the States included in the study and in specified States having 2,000 or more colored births annually*

State and color	Women dying from puerperal causes for whom a report on prenatal care was obtained and applicable[1]												
	Total	Who had received prenatal care										Who had received no prenatal care	
		Total	Percent[2]	Grade I		Grade II		Grade III		Ungraded			
				Number	Percent[2]	Number	Percent[2]	Number	Percent[2]	Number	Percent[2]	Number	Percent[2]
ALL STATES INCLUDED IN THE STUDY													
Total	**5,636**	**2,611**	**46**	**725**	**13**	**499**	**9**	**1,337**	**24**	**50**	**1**	**3,025**	**54**
White	4,568	2,354	52	694	15	458	10	1,157	25	45	1	2,214	48
Colored	1,068	257	24	31	3	41	4	180	17	5	(3)	811	76
STATES HAVING 2,000 OR MORE COLORED BIRTHS ANNUALLY													
Alabama	**935**	**202**	**22**	**36**	**4**	**29**	**3**	**136**	**15**	**1**	(3)	**733**	**78**
White	475	144	30	28	6	25	5	91	19	------	------	331	70
Colored	460	58	13	8	2	4	1	45	10	1	(3)	402	87
California	**343**	**231**	**67**	**69**	**20**	**61**	**18**	**100**	**29**	**1**	(3)	**112**	**33**
White	317	221	70	68	21	60	19	92	29	1	(3)	96	30
Colored	26	10	------	1	------	1	------	8	------	------	------	16	------
Kentucky	**491**	**165**	**34**	**23**	**5**	**27**	**5**	**115**	**23**	------	------	**326**	**66**
White	431	146	34	22	5	22	5	102	24	------	------	285	66
Colored	60	19	32	1	2	5	8	13	22	------	------	41	68
Maryland	**282**	**183**	**65**	**39**	**14**	**39**	**14**	**100**	**35**	**5**	**2**	**99**	**35**
White	198	140	71	34	17	27	14	74	37	5	3	58	29
Colored	84	43	51	5	6	12	14	26	31	------	------	41	49
Michigan	**944**	**561**	**59**	**195**	**21**	**125**	**13**	**227**	**24**	**14**	**1**	**383**	**41**
White	885	532	60	188	21	117	13	216	24	11	1	353	40
Colored	59	29	49	7	12	8	14	11	19	3	5	30	51
Oklahoma	**217**	**65**	**30**	**16**	**7**	**6**	**3**	**38**	**18**	**5**	**2**	**152**	**70**
White	182	64	35	16	9	6	3	37	20	5	3	118	65
Colored	35	1	------	------	------	------	------	1	------	------	------	34	------
Virginia	**627**	**250**	**40**	**33**	**5**	**33**	**5**	**181**	**29**	**3**	(3)	**377**	**60**
White	343	170	50	29	8	26	8	113	33	2	1	173	50
Colored	284	80	28	4	1	7	2	68	24	1	(3)	204	72

---

[1] Excludes induced abortions and cases in which pregnancy terminated before the third month.
[2] Not shown where number of women was less than 50.
[3] Less than 1 percent.

TABLE 29.—*Prenatal care received by women for whom a report was obtained and applicable [1] among women dying from puerperal causes in urban and rural areas of each State included in the study*

State and area	Women dying from puerperal causes for whom a report on prenatal care was obtained and applicable [1]												
	Total	Who had received prenatal care										Who had received no prenatal care	
		Total	Percent [2]	Grade I		Grade II		Grade III		Ungraded			
				Number	Percent [2]	Number	Percent [2]	Number	Percent [2]	Number	Percent [2]	Number	Percent [2]
Total	**5,636**	**2,611**	**46**	**725**	**13**	**499**	**9**	**1,337**	**24**	**50**	**1**	**3,025**	**54**
Urban	2,452	1,466	60	484	20	320	13	630	26	32	1	986	40
Rural	3,184	1,145	36	241	8	179	6	707	22	18	1	2,039	64
Alabama	**935**	**202**	**22**	**36**	**4**	**29**	**3**	**136**	**15**	**1**	(3)	**733**	**78**
Urban	223	66	30	21	9	14	6	31	14	-----	-----	157	70
Rural	712	136	19	15	2	15	2	105	15	1	(3)	576	81
California	**343**	**231**	**67**	**69**	**20**	**61**	**18**	**100**	**29**	**1**	(3)	**112**	**33**
Urban	196	139	71	46	23	36	18	57	29	-----	-----	57	29
Rural	147	92	63	23	16	25	17	43	29	1	1	55	37
Kentucky	**491**	**165**	**34**	**23**	**5**	**27**	**5**	**115**	**23**	-----	-----	**326**	**66**
Urban	103	68	66	13	13	15	15	40	39	-----	-----	35	34
Rural	388	97	25	10	3	12	3	75	19	-----	-----	291	75
Maryland	**282**	**183**	**65**	**39**	**14**	**39**	**14**	**100**	**35**	**5**	**2**	**99**	**35**
Urban	177	130	73	32	18	37	20	56	32	5	3	47	27
Rural	105	53	50	7	7	2	3	44	42	-----	-----	52	49
Michigan	**944**	**561**	**59**	**195**	**21**	**125**	**13**	**227**	**24**	**14**	**1**	**383**	**41**
Urban	640	391	61	138	22	95	15	149	23	9	1	249	39
Rural	304	170	56	57	19	30	10	78	26	5	2	134	44
Minnesota	**401**	**204**	**51**	**81**	**20**	**22**	**5**	**97**	**24**	**4**	**1**	**197**	**49**
Urban	173	107	62	52	30	13	8	39	23	3	2	66	38
Rural	228	97	43	29	13	9	4	58	25	1	(3)	131	57
Nebraska	**233**	**103**	**44**	**33**	**14**	**28**	**12**	**42**	**18**	-----	-----	**130**	**56**
Urban	77	44	57	21	27	14	18	9	12	-----	-----	33	43
Rural	156	59	38	12	8	14	9	33	21	-----	-----	97	62
New Hampshire	**98**	**50**	**51**	**5**	**5**	**7**	**7**	**38**	**39**	-----	-----	**48**	**49**
Urban	50	27	54	2	4	5	10	20	40	-----	-----	23	46
Rural	48	23	-----	3	-----	2	-----	18	-----	-----	-----	25	-----
North Dakota	**125**	**40**	**32**	**15**	**12**	**4**	**3**	**21**	**17**	-----	-----	**85**	**68**
Urban	25	13	-----	5	-----	2	-----	6	-----	-----	-----	12	-----
Rural	100	27	27	10	10	2	2	15	15	-----	-----	73	73
Oklahoma	**217**	**65**	**30**	**16**	**7**	**6**	**3**	**38**	**18**	**5**	**2**	**152**	**70**
Urban	64	28	44	9	14	2	3	13	20	4	6	36	56
Rural	153	37	24	7	5	4	3	25	16	1	1	116	76
Oregon	**123**	**87**	**71**	**27**	**22**	**9**	**7**	**51**	**41**	-----	-----	**36**	**29**
Urban	57	46	81	21	37	3	5	22	39	-----	-----	11	19
Rural	66	41	62	6	9	6	9	29	44	-----	-----	25	38
Rhode Island	**119**	**83**	**70**	**17**	**14**	**24**	**20**	**42**	**35**	-----	-----	**36**	**30**
Urban	113	81	72	17	15	24	21	40	35	-----	-----	32	28
Rural	6	2	-----	-----	-----	-----	-----	2	-----	-----	-----	4	-----

[1] Excludes induced abortions and cases in which pregnancy terminated before the third month.
[2] Not shown where number of women was less than 50.
[3] Less than 1 percent.

TABLE 29.—*Prenatal care received by women for whom a report was obtained and applicable* [1] *among women dying from puerperal causes in urban and rural areas of each State included in the study*—Continued

State and area	Women dying from puerperal causes for whom a report on prenatal care was obtained and applicable												
	Total	Who had received prenatal care										Who had received no prenatal care	
		Total	Percent	Grade I		Grade II		Grade III		Ungraded			
				Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Virginia	**627**	**250**	**40**	**33**	**5**	**33**	**5**	**181**	**29**	**3**	([3])	**377**	**60**
Urban	198	105	53	18	9	14	7	72	36	1	1	93	47
Rural	429	145	34	15	3	19	4	109	25	2	([3])	284	66
Washington	**202**	**121**	**60**	**53**	**26**	**20**	**10**	**48**	**24**			**81**	**40**
Urban	112	72	64	37	33	8	7	27	24			40	36
Rural	90	49	54	16	18	12	13	21	23			41	46
Wisconsin	**496**	**266**	**54**	**83**	**17**	**65**	**13**	**101**	**20**	**17**	**3**	**230**	**46**
Urban	244	149	61	52	21	38	16	49	20	10	4	95	39
Rural	252	117	46	31	12	27	11	52	21	7	3	135	54

[3] Less than 1 percent.

Special studies of small numbers of women indicate lower mortality rates among women receiving prenatal care than among those not receiving care. Material is lacking concerning care associated with all live births in the States included in this study, and therefore it is impossible to compare mortality rates for all mothers receiving prenatal care and mothers not receiving it. As the percentage of mothers who died who had received care is probably an index of the situation in regard to care in the various States, comparisons of mortality rates from puerperal causes and the percentage of women who died who had received care were made.

No association was found between the mortality rate from puerperal causes in a State and the percentage of women who died in that State who had had some prenatal care. Perhaps this is not surprising in view of the fact that the mortality rate in a State is affected by many factors other than prenatal care, such as the number of induced abortions. It must be remembered that women who died following early termination of pregnancy or following induced abortion are excluded from the figures on which the percentages of prenatal care are based but not from those used in computing the maternal mortality rate (table 30).

In order to eliminate the abortion factor the maternal mortality rate in the last trimester was compared with the percentage of women who died after receiving prenatal care. There was apparently a relationship between the percentage of women receiving prenatal care and those dying after they reached the third trimester of pregnancy, but the relationship is more definite between the percentage of women having grade I care and the mortality rate for women dying in this period. Those States in which a larger proportion of the women who died had received grade I prenatal care had in general lower mortality rates in the last trimester (table 31).

TABLE 30.—*Relation between percentage of women receiving prenatal care and mortality rate among women dying (a) from all puerperal causes, (b) from all puerperal causes after they reached the last trimester of pregnancy, and (c) from puerperal albuminuria and convulsions, in each State included in the study*

State	Percent of women receiving prenatal care	Mortality rate [1] from all puerperal causes	Mortality rate [1] from all puerperal causes, last trimester	Mortality rate [1] from puerperal albuminuria and convulsions
Alabama	22	85	66	31
Oklahoma	30	70	44	19
North Dakota	32	54	36	14
Kentucky	34	53	35	14
Virginia	40	67	49	19
Nebraska	44	59	36	12
Minnesota	51	49	33	12
New Hampshire	51	62	45	21
Wisconsin	54	54	39	12
Michigan	59	66	41	14
Washington	60	68	36	15
Maryland	65	59	40	13
California	67	59	37	12
Rhode Island	70	62	42	16
Oregon	71	62	33	14

Coefficients of correlation and probable errors:

(*a*) Percent receiving prenatal care and mortality rate from all puerperal causes:

$r = -0.3077 \pm 0.1577$

(*b*) Percent receiving prenatal care and mortality rate from all puerperal causes, last trimester:

$r = -0.5000 \pm 0.1306$

(*c*) Percent receiving prenatal care and mortality rate from puerperal albuminuria and convulsions:

$r = -0.5574 \pm 0.1206$

---

[1] Deaths per 10,000 live births.

TABLE 31.—*Relation between percentage of women receiving grade I prenatal care and mortality rate among women dying (a) from all puerperal causes after they reached the last trimester of pregnancy and (b) from puerperal albuminuria and convulsions, in each State included in the study*

State	Percent of women receiving grade I prenatal care	Mortality rate [1] from all puerperal causes, last trimester	Mortality rate [1] from puerperal albuminuria and convulsions
Alabama	4	66	31
Kentucky	5	35	14
New Hampshire	5	45	21
Virginia	5	49	19
Oklahoma	7	44	19
North Dakota	12	36	14
Maryland	14	40	13
Nebraska	14	36	12
Rhode Island	14	42	16
Wisconsin	17	39	12
Minnesota	20	33	12
California	20	37	12
Michigan	21	41	14
Oregon	22	33	14
Washington	26	36	15

Coefficients of correlation and probable errors:

(*a*) Percent receiving grade I prenatal care and mortality rate, last trimester:

$r = -0.6127 \pm 0.1088$

(*b*) Percent receiving grade I prenatal care and mortality rate from puerperal albuminuria and convulsions:

$r = -0.6323 \pm 0.1045$

---

[1] Deaths per 10,000 live births.

A relationship also appears between the percentage receiving prenatal care and the mortality rate from albuminuria and convulsions in the different States. The relationship is particularly apparent between the percentage receiving grade I care and the rate from this condition in the different States; the larger the percentage of women receiving prenatal care of this grade, the lower is the mortality rate from puerperal albuminuria and convulsions (tables 30 and 31).

DELIVERY CARE

Adequate care at the time of delivery is of paramount importance. Such care requires the maintenance of aseptic technique, the careful management of normal labor, and the proper handling of any abnormalities. These in turn imply an attendant who has not only skill but patience and good judgment. The actual evaluation of all these factors is obviously difficult and can be made only through a careful appraisal of each individual case with complete knowledge of the circumstances. In this study no attempt was made to grade the types of delivery care given, but the simplest and most objective of the factors involved were studied separately. The place of delivery, type of attendant at birth, technique of the physician as regards asepsis, and the use of pituitrin will be discussed in this section. Operations and the handling of emergencies will be taken up in other sections.

One third of the deaths in the study occurred before the women reached the last trimester of pregnancy. These cases are discussed in the sections on abortion, ectopic gestation, and operations, and in the sections dealing with the specific causes of death. This section will deal only with those women who had reached the last trimester of pregnancy.

HOSPITALIZATION AT DELIVERY

Of the 4,965 women who had reached the last trimester of pregnancy 1,971 were in hospitals for delivery or at the time of death if they died undelivered, 2,990 were delivered, or died undelivered, outside hospitals, and for 4 the place of delivery was not reported. The hospitalization of 899 of the 1,971 women was planned, for 1,018 it was emergency hospitalization; for 54 this was not reported. (See General Considerations, table 12, p. 26.)

About half (827) of the 1,725 white women who were in hospitals for delivery had planned hospitalization, 848 had emergency hospitalization, and for 50 this was not reported. The number of white women who were delivered or who died undelivered outside hospitals was 2,298, and the 4 women whose place of delivery was not known were white.

Only 246 of the 938 colored women who died after reaching the last trimester were in hospitals for delivery; 72 of these had planned and 170 had emergency hospitalization; for 4 this was not reported. Most of the colored women (692 of the 938) were delivered, or died undelivered, outside hospitals.

The size and standards of the hospitals in which women whose deaths make up this report were delivered are given in appendix tables II to V (pp. 186–189). As the total number of deliveries occurring in these hospitals is not known, there are no data on the mortality rates in hospitals and outside hospitals, nor in the different types of hospitals. Even if there were such data, the large and varying proportions of complicated cases among those delivered in hospitals invalidate comparisons. Perhaps the chief value of this study as regards hospitalization lies in its directing attention to the fact that hospital mortality rates and mortality rates in the general population are not comparable. (See also General Considerations, p. 25.)

ATTENDANT AT CONFINEMENT

In all the States studied

Information on the attendant at delivery, or at death if the patient died undelivered, was obtained for 4,903 of the 4,965 women who died after reaching the last trimester. Of these 4,903 women, 4,065 (83 percent) were attended at confinement exclusively by physicians, internes, or medical students (including 3,915 by physicians only, 87 by physicians preceded by internes or medical students, and 63 by internes or medical students only). Midwives attended 550 (11 percent) of the 4,903 women, including 193 for whom physicians (in 2 cases internes) were called in before the delivery was completed. One hundred and seventy-two women (4 percent) had other nonmedical attendants, such as relatives, followed in 47 cases by physicians; and 116 women (2 percent) were said to have been unattended at the time of delivery or at death if they died undelivered (table 32).

TABLE 32.—*Attendant at confinement and technique of principal physician[1] among women dying from puerperal causes who had reached the last trimester of pregnancy*

Attendant at confinement	Women dying from puerperal causes who had reached last trimester					
	Total	Technique of principal physician [1]				
		Aseptic	Attempted aseptic	Clean, not sterile	Dirty	Not reported or no physician
Total	**4,965**	**1,740**	**510**	**1,099**	**270**	**1,346**
Physician	*4,065*	*1,700*	*492*	*1,012*	*226*	*635*
Only	3,915	1,566	484	1,011	224	630
Preceded by interne or student	87	78	5	1	1	2
Interne or student only	63	56	3		1	3
Midwife	*550*	*33*	*14*	*80*	*32*	*391*
Only	357					357
Followed by physician	191	31	14	80	32	34
Followed by interne or student	2	2				
Other attendant	*172*	*7*	*4*	*7*	*12*	*142*
Only	125					125
Followed by physician	47	7	4	7	12	17
None	*116*					*116*
No report on attendant	*62*					*62*

[1] Includes interne or student. When there was more than one physician the one who did the actual delivery or who was finally in charge if the woman died undelivered was called the principal physician.

Of the 3,987 white women concerning whom there was a report on attendant, 3,536 (89 percent) had been attended by physicians, internes, or students (3,431 by physicians only, 66 by physicians preceded by internes or students, and 39 by internes or students only).

Midwives attended 232 women (6 percent); in 86 of the 232 cases a physician was called in to complete the delivery. Other persons attended 141 women (4 percent), followed in 41 cases by physicians; 78 (2 percent) were unattended.

A smaller proportion of the colored women were attended at confinement by physicians. Information was obtained for 916 women; 529 (58 percent) were attended by physicians, internes, or students (484 by physicians only, 24 by internes and students only, and 21 by internes or students followed by physicians). Midwives had attended 318 (35 percent), followed in 107 cases by physicians. Other persons attended 31 (3 percent), followed in 6 cases by physicians; 38 (4 percent) were unattended.

No study of the qualifications of the individual physicians or midwives attending these patients was made. There were probably a few foreign-trained midwives in Michigan, Minnesota, and Wisconsin and in some of the larger cities in other States; the great majority, however, were "grannies" and neighbor women who were classified as midwives because they made a practice of delivering women for pay. What instruction they may have received from official sources had been directed almost exclusively toward cleanliness, noninterference, prophylaxis against ophthalmia neonatorum, and the registration of births; but many of them had had no instruction whatever.

In individual States

The number of deaths of women who had been attended at confinement in the last trimester by physicians, midwives, and others in the different States is given in table 33. All cases in which the patient was delivered by a midwife and all in which a midwife was known to have been in attendance for the purpose of delivering the patient, even if a physician did the actual delivery, were classified as having been attended by midwives. If the midwife was present merely as a nurse, the case was not assigned to midwives. (It is possible that in some cases of women delivered by physicians previous midwife attendance was not known to or at least not reported by the physician. This would be more likely to happen among the Negroes.) Many of the women attended at confinement only by midwives or others finally were seen by a physician before their death.

It will be seen from table 33 that 462 of the 550 women attended at confinement by midwives died in Alabama, Kentucky, Maryland, and Virginia. These 4 were the only States of the 15 included in the study in which the number of deaths of women attended by midwives constituted 10 percent or more of the total number of last-trimester deaths.

In *Alabama* midwives had attended at confinement 24 percent of 838 women who died of puerperal causes after reaching the last trimester and concerning whom a report was obtained on attendant at confinement. Physicians (including internes or students) had attended 72 percent. The remaining 4 percent were attended by some nonmedical person or were unattended. During the 2 years of the study, according to the Bureau of Vital Statistics of the Alabama State Board of Health, midwives reported 28 percent, physicians reported 71 percent, and others reported less than 1 percent of the total live births.

TABLE 33.—*Attendant at confinement of women who had reached the last trimester of pregnancy dying from puerperal causes in each State included in the study*

State	Women dying from puerperal causes who had reached last trimester														
	Total	Attendant at confinement reported													Attendant at confinement not reported
		Total	Physician		Midwife						Other		None		
					Total		Alone		Followed by physician						
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Total	4, 965	4, 903	4, 065	83	550	11	357	7	193	4	172	4	116	2	62
Alabama	859	838	602	72	202	24	165	20	37	4	10	1	24	3	21
California	310	305	259	85	12	4	6	2	6	2	21	7	13	4	5
Kentucky	428	424	323	76	69	16	49	12	20	5	17	4	15	4	4
Maryland	255	252	209	83	30	12	10	4	20	8	12	5	1	([1])	3
Michigan	809	799	743	93	18	2	8	1	10	1	32	4	6	1	10
Minnesota	334	334	299	90	16	5	11	3	5	1	15	4	4	1	-----
Nebraska	200	199	182	91	6	3	2	1	4	2	6	3	5	3	1
New Hampshire	79	78	75	96	-----	-----	-----	-----	-----	-----	1	1	2	3	1
North Dakota	106	105	88	84	7	7	5	5	2	2	9	9	1	1	1
Oklahoma	190	184	166	90	10	5	8	4	2	1	7	4	1	1	6
Oregon	96	96	88	92	1	1	1	1	-----	-----	3	3	4	4	-----
Rhode Island	113	110	101	92	1	1	1	1	-----	-----	4	4	4	4	3
Virginia	566	566	362	64	161	28	83	15	78	14	21	4	22	4	-----
Washington	169	168	157	93	4	2	2	1	2	1	4	2	3	2	1
Wisconsin	451	445	411	92	13	3	6	1	7	2	10	2	11	2	6

[1] Less than 1 percent.

Data on attendant at confinement were obtained concerning 435 of the 444 white women who died in Alabama after reaching the last trimester. Of these 435 women, 89 percent had been attended by physicians, 8 percent by midwives or by midwives followed by physicians, 3 percent by others or by no one. During the same 2 years 92 percent of the white live births had been reported by physicians, 7 percent by midwives, and less than 1 percent by others.

Of the 403 colored women who died after reaching the last trimester and concerning whom there was a report on attendant, 53 percent had had, as far as was known, physicians only, 41 percent had been attended by midwives, 2 percent had been attended by others, and 4 percent had had no attendant. In the same period physicians had reported 33 percent of the colored live births, midwives 67 percent, and others less than 1 percent.

In *Kentucky* physicians attended 76 percent, midwives 16 percent, and others 4 percent of the 424 women who died after reaching the last trimester and for whom data on attendant at confinement were obtained; the remaining 4 percent were unattended. During the same 2 years, according to the Bureau of Vital Statistics of the Kentucky State Board of Health, physicians reported 84 percent and midwives and others 16 percent of the total number of live births.

In *Maryland* physicians had attended 83 percent, midwives 12 percent, and others 5 percent of the 252 women who died of puerperal causes after reaching the last trimester and concerning whom there was a report on attendant at confinement. According to the Maryland State Bureau of Vital Statistics, physicians reported 85 percent and midwives 14 percent of the total live births; less than 1 percent were reported by other persons.

In *Virginia* physicians had attended 64 percent, midwives 28 percent, and others 4 percent of the 566 women who died after reaching the last trimester; 4 percent had been unattended. According to the Virginia State Bureau of Vital Statistics, physicians had reported 69 percent, midwives 30 percent, and others 1 percent of the total live births.

Of the 318 white women who died after reaching the last trimester physicians had attended at confinement 78 percent, midwives 15 percent, and others 3 percent; 3 percent had been unattended. Physicians reported 86 percent and midwives 14 percent of the total white live births in the State.

Of the 248 colored women who died after reaching the last trimester, physicians had attended 46 percent, midwives 45 percent, and others 4 percent, while 4 percent had been unattended. Physicians reported 31 percent and midwives 69 percent of the colored live births during the same 2-year period.

Special conditions affecting cases attended by midwives

White women.—The 146 white women in Kentucky, Virginia, and Alabama who died after having been attended at their confinements in the last trimester by midwives form a distinct group. Most of them lived in the very rugged or mountainous portions of these States. In general their isolation was the primary and poverty a secondary reason for their having midwives rather than physicians. It was usually very difficult for the midwife to get medical help even if she knew that it was urgently needed. Nineteen percent of these 146 women had had no medical attention from the beginning of pregnancy until death, and 21 percent more had not been seen by a physician until they were moribund.

Of the 15 Maryland white women who died after midwife attendance, all but 4 lived in Baltimore. The midwives there were more closely supervised than was possible in the mountains of Kentucky, Virginia, and Alabama.

Colored women.—The midwives that attended the colored births in these four States were colored "grannies." They were employed rather than physicians because their patients were not accustomed to the services of a physician at childbirth and could not afford a physician's care. In contrast to conditions in the corresponding group of white women, inaccessibility was not an important factor in general. Of the 298 colored women who died after midwife attendance in these four States, concerning whom medical attention was reported, 34 (11 percent) had had no medical attention whatever and 59 (20 percent) were first seen by a physician when moribund.

Thirty percent of the deaths of colored women in these four States who had been attended at confinement by midwives were from puerperal albuminuria and convulsions, as compared with 45 percent from this cause in the group of colored women in the same States who had been attended by physicians. These percentages suggest that many of the colored patients called in a physician rather than a midwife because of the appearance of alarming symptoms of toxemia; and this supposition is confirmed by the report as to the condition when first seen, of 178 out of the 190 colored women dying from this cause who had been attended by physicians. One hundred and six

(60 percent) were in coma or in convulsions when the physician first saw them, and 44 others (25 percent) were in poor condition; only 28 (16 percent) of the 178 women were in good or fair condition.

TECHNIQUE OF PRINCIPAL PHYSICIAN[3]

The technique as to asepsis was studied only in the cases in which a physician was in attendance for at least part of the delivery, as it may safely be assumed that the midwives did not use sterile technique. The technique of the principal physician at confinement was reported in 3,619 of the 4,305 cases in which a physician attended women who died after reaching the last trimester. (See table 32, p. 56.) In 1,740 cases (48 percent) an aseptic technique was said to have been used. This included shaving, scrubbing, and sterile drapes, instruments, and rubber gloves, and adequate assistance at the delivery.[4] In 510 cases (14 percent) in which the technique was graded as "attempted aseptic" a similar technique was used; but the circumstances rendered the preservation of strict asepsis unlikely, or there were known "breaks" in technique. In 1,099 cases (30 percent) the technique was "clean but not sterile". This meant ordinary cleanliness and, usually, sterilization of any instruments used. In many cases the principal physician whose technique was assigned to one of these three classes was preceded by someone whose technique was less careful. In 270 cases (7 percent) not even ordinary cleanliness was used.

The technique as described may be somewhat better than that which was actually used. The grading of technique was based on the description given by the principal physician himself. When he did not remember the exact circumstances of a case, his customary technique, if reported, was accepted as a basis for grading.

Of the 3,089 cases of white women attended by physicians for which the principal physician reported his technique, aseptic technique was reported in 1,538 cases (50 percent); attempted aseptic, in 458 cases (15 percent); clean, not sterile, in 889 cases (29 percent); and not clean, in 204 cases (7 percent).

Of the 530 cases of colored women attended by physicians for which the principal physician reported his technique, aseptic technique was reported in 202 cases (38 percent); attempted aseptic, in 52 cases (10 percent); clean, not sterile, in 210 cases (40 percent); and not clean, in 66 cases (12 percent). The physician was preceded by a midwife in a larger proportion of the colored cases than of the white cases.

In addition to the cases shown in table 32 in which the principal physician was preceded by a midwife or some other nonmedical attendant, there were 229 cases in which he was known to have been preceded by another physician with less careful technique. In 212 of these 229 cases the principal physician's technique was classed as aseptic; in 10 cases, as attempted aseptic; and in 7 cases, as clean, not sterile.

An analysis of the causes of the 4,965 last-trimester deaths shows that the better the technique used at confinement, the smaller was the proportion of the deaths caused by puerperal septicemia (table 34).

---

[3] When there was more than 1 physician, the one who did the actual delivery or who was finally in charge if the woman died undelivered was called the principal physician.

[4] Although the use of masks in the delivery room is now considered an essential in aseptic technique it was very uncommon at the time of the study, and an inquiry on this point was therefore not included in the schedule.

TABLE 34.—*Technique of principal physician at confinement of women dying from puerperal septicemia and from all other puerperal causes who had reached the last trimester of pregnancy*

Technique of principal physician at confinement	Women dying from puerperal causes who had reached last trimester				
	Total	Puerperal septicemia		All other causes	
		Number	Percent [1]	Number	Percent [1]
Total	**4, 965**	**1, 529**	**31**	**3, 436**	**69**
Women attended by physician only [2]	*4, 065*	*1, 177*	*29*	*2, 888*	*71*
Aseptic technique:					
Only	1, 488	348	23	1, 140	77
Preceded by less careful technique of another physician	212	79	37	133	63
Attempted aseptic technique:					
Only	482	144	30	338	70
Preceded by less careful technique of another physician	10	4		6	
Clean, not sterile technique:					
Only	1, 005	361	36	644	64
Preceded by less careful technique of another physician	7	5		2	
Dirty technique	226	95	42	131	58
No report on technique	635	141	22	494	78
Women attended by midwife or other person [3]	*722*	*301*	*42*	*421*	*58*
No attendant	*116*	*28*	*24*	*88*	*76*
No report on attendant	*62*	*23*		*39*	

---

[1] Not shown where number of women was less than 50.
[2] Includes interne or student.
[3] Includes midwife or other person followed by physician.

Vaginal examinations

The principal physician made vaginal examinations in 2,765 of the 3,854 cases of women dying after they reached the last trimester for whom there was a report—in 2,188 cases with rubber gloves, in 484 without rubber gloves, and in 93 cases in which there was no report on rubber gloves. Further data on vaginal examinations are given in table 35. In this table is shown the technique only of the physician who actually delivered the patient or who was in charge if she died undelivered. Previous vaginal examinations by other persons are not reported. When the physician did not remember the exact number of examinations, his customary number, if given, was used.

TABLE 35.—*Vaginal examinations and use of rubber gloves by principal physician at confinement of women dying from puerperal causes who had reached the last trimester of pregnancy*

Vaginal examination	Women dying from puerperal causes who had reached last trimester				
	Total	Use of rubber gloves by physician			
		Used	Not used	Not reported	Inapplicable [1]
Total	**4, 965**	**3, 162**	**688**	**455**	**660**
No vaginal examination	*1, 089*	*824*	*189*	*76*	
Vaginal examination	*2, 765*	*2, 188*	*484*	*93*	
1	871	735	100	36	
2	565	471	88	6	
3 or more	771	552	201	18	
Number not reported	558	430	95	33	
No report on vaginal examination	*451*	*150*	*15*	*286*	
Inapplicable [1]	*660*				*660*

[1] No physician or no report as to physician.

Rectal examinations

Rectal examinations were reported to have been made by the principal physician in 778 cases and not made in 2,845 cases; in 682 cases there was no report. In 434 cases the physician made rectal but no vaginal examinations; in 326 cases he made both rectal and vaginal examinations; and in 18 cases in which he made rectal examinations there was no report as to vaginal examinations (table 36).

Table 36.—*Vaginal and rectal examinations made by principal physician at confinement of women dying from puerperal causes who had reached the last trimester of pregnancy*

Vaginal examination	Women dying from puerperal causes who had reached last trimester				
	Total	Rectal examination			
		Yes	No	Not reported	Inapplicable [1]
Total	**4,965**	**778**	**2,845**	**682**	**660**
No vaginal examination	*1,089*	*434*	*609*	*46*	
Vaginal examination	*2,765*	*326*	*2,221*	*218*	
1	871	155	651	65	
2	565	54	483	28	
3 or more	771	70	661	40	
Number not reported	558	47	426	85	
No report on vaginal examination	*451*	*18*	*15*	*418*	
Inapplicable [1]	*660*				*660*

[1] No physician or no report as to physician.

USE OF PITUITRIN

Of the 4,305 cases of women delivered in the last trimester having as attendant a physician, an interne, or a medical student, there was a report on the use of pituitrin in 3,718. Pituitrin was not used in 1,979 cases; in 711 cases it was used before the birth of the child, in 1,004 cases after the birth of the child only, and in 24 cases at an unreported stage of labor. In the group in which pituitrin was not used, 41 percent of the deaths were due to puerperal albuminuria and convulsions, 25 percent to puerperal septicemia, 9 percent to puerperal hemorrhage, and 24 percent to other causes. In the group in which pituitrin had been used before the birth of the child, 21 percent of the deaths were due to puerperal albuminuria and convulsions, 35 percent to puerperal septicemia, 19 percent to puerperal hemorrhage, and 24 percent to other causes. This difference was probably related, in part, to the fact that many of those with eclampsia died without going into labor.

Sixty-one percent of the cases in which the character of issue was reported resulted in live births in the group in which no pituitrin was used and 59 percent in the group in which pituitrin was used before the delivery of the child. However, in the group in which no pituitrin was used, 29 percent resulted in stillbirths and 10 percent were undelivered, while in the group in which pituitrin was used in the first or second stage of labor 39 percent were stillbirths and 1 percent were undelivered. This may be partly due to the fact that there were a larger number of fatal eclampsia cases without delivery in the group in which pituitrin was not used.

Pituitrin was used in 1,492 (47 percent) of the 3,161 cases of white women attended by physicians for which there was a report on this point, including 614 cases (19 percent of the 3,161) in which it was used before the birth of the child (in 20 cases for induction) and 855 cases (27 percent) in which it was used only in the third stage or postpartum; in 23 cases the stage of labor at which it was used was not stated.

Among the 557 cases of colored women delivered by physicians and having a report with regard to pituitrin it was used in 247 cases (44 percent), including 97 cases (17 percent of the 557) before the birth of the child (in 3 cases for induction), 149 cases (27 percent) after delivery only, and 1 case in which the stage of labor at the time of its use was not reported.

POSTPARTUM CARE

The postpartum care of these women depended to a great extent on the abnormalities that were present and will, therefore, be discussed under the various causes of death. It may be stated here that 605 women who had been delivered elsewhere died in hospitals; 534 of these were white and 71 were colored. Most of these were hospitalized on account of complications of the puerperium.

COMMENT BY ADVISORY COMMITTEE

This section shows clearly what a serious situation exists in regard to the quality of the maternal care that many women receive in this country during their pregnancy. Although this study covered but 15 States, they represent a fair cross section of the country, and therefore it is probably fair to assume that the findings in this section are applicable to the country as a whole.

It is discouraging to find that of the women on whom a report as to prenatal care could be obtained and who could reasonably have been expected to have such care, 54 percent had had no prenatal examination by a physician. In only 1 percent was the care given up to the standard that it is the right of every pregnant patient to have and to demand.

For the deaths of the women who had had no prenatal examination the attending physician could hardly be held responsible, for he was not consulted until an emergency had arisen. Gross ignorance, carelessness, and sociological and economic problems all had a share in this responsibility. However, in those cases in which the physician was consulted he was responsible for providing adequate maternal care; and in many of these cases physicians failed in their responsibility, for half the women who did consult a physician had poor prenatal care.

Although the question of prenatal care was considered for only 45 percent of the women who died before they reached the last trimester of pregnancy, 80 percent of these 1,064 women had no care or poor care. Furthermore, many of the 20 percent who had good or indifferent care already had troublesome symptoms before they consulted a physician. Of those women who died after reaching the last trimester and for whom a report was obtained, 78 percent had poor prenatal care or none.

Evidence of the value of prenatal care may be found in the fact that smaller proportions of the women who died after good prenatal care than of those who died after poor prenatal care died of puerperal albuminuria and convulsions. Further evidence may be found in the larger proportion of live births in those cases in which there had been good prenatal care, and in the fact that those States with more good prenatal care, even among the women who died, had lower death rates from albuminuria and convulsions.

Primiparæ and the mothers of many children particularly need prenatal care, but many of these women failed to receive it.

Prenatal care, such as it was, was much more frequent among the white than among the colored women, and in both groups it was more frequent in the urban than in the rural areas. In the rural areas among the colored women there was practically no prenatal care, for 83 percent had none and 13 percent had grade III, which is poor care.

Delivery care, though as important as prenatal care, was more difficult to evaluate, but certain facts were noted. For more than half the women who died in hospitals after reaching the last trimester, hospitalization was an emergency measure. Among the colored women emergency hospitalization was much more frequent than among the white women. Eighty-three percent of the women were attended by physicians, internes, or medical students, 11 percent by midwives, 4 percent by nonmedical attendants; 2 percent of the women had no attendant at the delivery or at the death if the patient died undelivered.

Figures given in the report would indicate that, though the midwives played a part in the mortality, they could not have been responsible for any large proportion of the deaths because they attended a relatively small percentage of the cases.

No study of the qualifications of the individual physicians or midwives was attempted. As it was known, however, that the majority of the midwives were ignorant "grannies", it may safely be assumed that these midwives did not use a satisfactory aseptic technique at delivery. In 48 percent of the cases the physicians described their technique, as they remembered it, in such a way that it was classified as aseptic; but obviously this is not a sure way of determining how good this technique was. The point to be noted is that the physicians themselves admitted it was unsatisfactory in more than 50 percent of the cases. The frequency of vaginal examinations, oftentimes without gloves, is clear, and the relatively small number of rectal examinations must be noted.

Although the data on the use of pituitrin are incomplete, its use is shown to be common and to be associated with serious accidents. Higher percentages of maternal deaths from sepsis and from hemorrhage occurred among those who had it than among those who did not have it. The percentages of ruptured uterus and of stillbirths also were higher.

The almost total lack of adequate prenatal care and the relative infrequency of any prenatal care were outstanding. Besides permitting the unchecked development of unfavorable factors during pregnancy, this situation led to delivery care that was unsatisfactory because given without previous knowledge of the case and frequently in circumstances that necessitated emergency hospitalization.

OPERATIONS

More than half the women who died from puerperal causes in the years and States of the study had had some operative procedure before death. Of the 7,234 women concerning whom there was a report on this point, 3,370 (47 percent) had had no operation, 2,649 (37 percent) had had an operation directed toward delivery (including 6 percent who had had both an operative delivery and at least one other operation), and 1,131 (16 percent) had had some other operation only. The other 84 women either had had no operative delivery with no report as to other operation or had had some other operation with no report as to operative delivery. By operative delivery is meant an operation for the purpose of delivering the fetus or for the immediate removal of the placenta. Attempts at these operations, as well as completed operations, are included. The other operations were secondary, usually on account of sequelae of the delivery; a few operations for associated conditions, particularly routine appendectomies, are included.

There were more operations among women who died in the urban than in the rural districts, and more operations among white than among colored women (table 37).

OPERATIONS IN THE LAST TRIMESTER

OPERATIONS FOR DELIVERY

Of the 4,965 women who reached the last trimester of pregnancy, 2,225 were known to have had an operative delivery or an attempt at operative delivery (table 38).

Type of operation

Cesarean section preceded the deaths of 531 women who had reached the last trimester. For 62 of them attempts had been made at some other method of delivery. The deaths following Cesarean section are discussed in detail in the section on that subject. (See p. 89.)

TABLE 37.—*Frequency of operative deliveries and other operations among white and colored women dying from puerperal causes in urban and rural areas*

Operation	Women dying from puerperal causes					
	Total		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	7,380		3,462		3,918	
Report on operation	**7,234**	**100**	**3,412**	**100**	**3,822**	**100**
Report on operative delivery	2,649	37	1,405	41	1,244	33
Operative delivery only	*2,236*	*31*	*1,123*	*33*	*1,113*	*29*
Operative delivery and other operation	*413*	*6*	*282*	*8*	*131*	*3*
No operative delivery, no report on other operation	61	1	23	1	38	1
Other operation only	1,131	16	642	19	489	13
Other operation, no report on operative delivery	23	(1)	19	1	4	(1)
No operation	3,370	47	1,323	39	2,047	54
No report on operation	**146**		**50**		**96**	
WHITE						
Total	6,072		2,951		3,121	
Report on operation	**5,973**	**100**	**2,913**	**100**	**3,060**	**100**
Report on operative delivery	2,270	38	1,224	42	1,046	34
Operative delivery only	*1,899*	*32*	*968*	*33*	*931*	*30*
Operative delivery and other operation	*371*	*6*	*256*	*9*	*115*	*4*
No operative delivery, no report on other operation	36	1	17	1	19	1
Other operation only	993	17	567	19	426	14
Other operation, no report on operative delivery	22	(1)	18	1	4	(1)
No operation	2,652	44	1,087	37	1,565	51
No report on operation	**99**		**38**		**61**	
COLORED						
Total	1,308		511		797	
Report on operation	**1,261**	**100**	**499**	**100**	**762**	**100**
Report on operative delivery	379	30	181	36	198	26
Operative delivery only	*337*	*27*	*155*	*31*	*182*	*24*
Operative delivery and other operation	*42*	*3*	*26*	*5*	*16*	*2*
No operative delivery, no report on other operation	25	2	6	1	19	2
Other operation only	138	11	75	15	63	8
Other operation, no report on operative delivery	1	(1)	1	(1)		
No operation	718	57	236	47	482	63
No report on operation	**47**		**12**		**35**	

---

(1) Less than 1 percent.

TABLE 38.—*Type of operation for delivery performed on women dying from puerperal causes who had reached the last trimester of pregnancy*

Type of operation for delivery	Women dying from puerperal causes who had reached last trimester	
	Number	Percent distribution
Total	4,965	
Operation	**2,225**	**100**
Forceps:		
Only	518	23
With dilatation of cervix	150	7
With manual removal of placenta	24	1
With dilatation of cervix and manual removal of placenta	12	1
With other operation	14	1
Cesarean section:		
Only	469	21
Following other operation	62	3
Version:		
Only	218	10
With dilatation of cervix	224	10
With dilatation of cervix and manual removal of placenta	48	2
With manual removal of placenta	26	1
With forceps	64	3
With dilatation of cervix and forceps	21	1
With forceps and manual removal of placenta	10	(1)
With dilatation of cervix, forceps, and manual removal of placenta	3	(1)
With other operation	4	(1)
Dilatation of cervix:		
Only	108	5
With manual removal of placenta	4	(1)
Manual removal of placenta	87	4
Craniotomy or embryotomy following other operation	57	3
Breech extraction:		
Only	42	2
With dilatation of cervix and/or manual removal of placenta	23	1
Laparotomy for ectopic gestation	8	(1)
Other single operations	12	1
Other operation of more than one type	8	(1)
Type of operation not reported	9	(1)
No operation	**2,607**	
No report on operation	**133**	

[1] Less than 1 percent.

Forceps, the most frequent operation, was the principal operation for delivery in 718 cases (14 percent of all cases of women who died after reaching the last trimester and 32 percent of operative deliveries in this period), and in addition there were 98 cases of forceps and version combined. (See p.68.) In 150 of the 718 cases the application of forceps followed mechanical induction of labor or artificial dilatation of the cervix [1]—manually, by bag, or by some other method; in 24 cases the use of forceps was followed by manual removal of the placenta; in 12 cases all three of these operations were performed; and in 14 cases forceps were used in combination with some other operation. Of the 162 women (including the 12 with manual removal of the placenta also) in whose cases the use of forceps followed induction of labor or artificial dilatation of the cervix, 106 were not in labor when the dilatation of the cervix was begun; in 56 cases of women in labor the dilatation of the cervix was done to facilitate delivery.

The 718 forceps cases include 2 in which the woman subsequently delivered spontaneously and 13 in which she died undelivered after unsuccessful attempts at delivery by forceps.

---

[1] Throughout the report "artificial dilatation of the cervix" includes mechanical induction of labor.

The deaths of 253 (35 percent) of these 718 women were attributed to puerperal albuminuria and convulsions according to the International List of Causes of Death; 186 (26 percent), to puerperal septicemia; 48 (7 percent), to puerperal phlegmasia alba dolens, embolus, sudden death; 33 (5 percent), to placenta previa; 81 (11 percent), to other puerperal hemorrhage; 111 (15 percent), to other accidents of labor; and 6 (approximately 1 percent), to the other puerperal causes. Of the 162 cases in which artificial dilatation of the cervix preceded the use of forceps, the death was attributed to puerperal albuminuria and convulsions in 62 percent; to puerperal septicemia in 9 percent; to phlegmasia alba dolens in 2 percent; to placenta previa in 10 percent; to other puerperal hemorrhage in 9 percent; and to other causes in 8 percent.

In 98 cases attempts at both forceps and version operations were made. These included: Forceps and version, 64 cases; dilatation of the cervix, forceps, and version, 21 cases; forceps, version, and manual removal of the placenta, 10 cases; and 3 cases in which all four operations were performed. In 8 of the 24 cases with artificial dilatation of the cervix labor had already begun spontaneously. According to the final method of delivery these 98 cases may be classified as follows: The delivery in 51 cases was completed by version after forceps had failed; 25 women were delivered by version with forceps on after-coming head; there were 5 cases in which forceps had failed and the delivery was completed by version with forceps on after-coming head; 5 women were delivered by forceps after attempts at version had failed; there were also 5 cases in which attempts at version and forceps delivery both failed and the women died undelivered. Seven women who were delivered of twins each had one baby delivered by version and one by forceps.

Of these 98 deaths 32 percent were attributed, according to the international classification, to puerperal septicemia; 20 percent, to puerperal albuminuria and convulsions; 12 percent, to placenta previa; 12 percent, to other puerperal hemorrhage; 18 percent, to other accidents of labor; 4 percent, to phlegmasia alba dolens; and 1 percent, to accidents of pregnancy.

Other attempts at forceps or version or both were made in 44 cases of women finally delivered by Cesarean section and in 46 cases of women finally delivered by craniotomy.

Version[2] was the principal operation for delivery in 520 cases besides the 98 just mentioned in which forceps was used in combination with version; or in a total of 618 cases—12 percent of all cases of women who died after reaching the last trimester and 28 percent of those who had operative deliveries in this period. In 224 of the 520 cases version followed artificial dilatation of the cervix (manually, by bag, or by some other method); in 26 cases it was followed by manual removal of the placenta, in 48 cases it was accompanied by both these operations, and in 4 cases it was accompanied by some other operation or combination of operations. *Therefore in a total of 272 cases version was preceded by dilatation of the cervix.* Eighty-four of these were cases in which labor had begun spontaneously but the dilatation of the cervix was assisted artificially to facilitate delivery; in 172 cases the dilatation was done to induce labor as well as to facilitate delivery; in 3 cases labor had been induced medically; and in 13 cases it was not reported whether the onset of labor was spontaneous or artificial.

---

[2] Version throughout the report refers to internal podalic version. The very small number of cephalic versions that were done were included with other combinations. External versions were not considered operations.

Six of the 520 women died undelivered after attempts at version had failed. These were in addition to the five women previously mentioned for whom attempts at version and at forceps delivery had both failed.

Of these 520 deaths 32 percent were attributed to placenta previa and 10 percent to other puerperal hemorrhage; 28 percent to puerperal albuminuria and convulsions; 19 percent to puerperal septicemia; 2 percent to phlegmasia alba dolens; and 9 percent to other puerperal causes.

In addition to the cases already mentioned, the cervix was dilated manually, by bag, or by other artificial means in 112 cases. Eighty-nine women later delivered spontaneously, but 23 women died undelivered without attempts at other operations. Four of those who delivered spontaneously also had manual removal of the placenta. In 29 of these 112 cases labor had already begun spontaneously, and in 1 case labor had been induced medically, the dilatation being used to facilitate the delivery.

Eighty-seven women, in addition to the four just mentioned, had manual removal of the placenta after spontaneous labor and delivery.

Sixty-five women were delivered by breech extraction, alone or preceded by artificial dilatation of the cervix or followed by manual removal of the placenta. Seven of these had had labor induced operatively and one medically; 55 had gone into labor spontaneously; and for 2 the type of onset of labor was not reported.

Fifty-seven women were delivered by craniotomy or embryotomy, usually after attempts at other operations had failed; 2 of these had had labor induced, 1 operatively and 1 medically; the onset of labor in the other cases had been spontaneous.

Eight women with abdominal pregnancies were delivered by laparotomy in the last trimester. (See Ectopic Gestation, p. 172.)

Twelve women had had some other operation and eight had had some other combination of operations directed toward delivery; nine women had had some operation for delivery, but its type was not reported.

For 133 women no report could be obtained as to whether or not there had been an operative delivery. (For type of operation for delivery by cause of death see appendix table XI, p. 196.)

Type of operative delivery and parity and age

The deaths of 57 percent of the known primiparae and 41 percent of the known multiparae who had reached the last trimester were preceded by operative deliveries. The relation of operations for delivery to number of pregnancies is shown in appendix table XII (p. 198). Cesarean sections decreased from 17 percent for primiparae, through 12 percent for secundiparae, to 8 percent for triparae.

The percentage of deaths preceded by version and version combinations increased from 10 percent for women in their first pregnancy to 16 percent for those with five pregnancies. It decreased slightly for the sixth and seventh pregnancies and rose again to 21 percent of those dying as a result of eight or more pregnancies. Dilatation of the cervix preceding versions was also more common in the later than in the earlier pregnancies.

The frequency of forceps operations (exclusive of forceps with version) dropped rapidly from 24 percent for primiparae to 11 percent for women in the second pregnancy, 9 percent for women in the third, and 8 percent for women in the fourth pregnancy. There were some variations in the frequency after the fourth pregnancy, but the changes were slight and not significant.

Five percent of the women who died after seven or fewer pregnancies were reported to have had manual removal of the placenta, either alone or in combination with some other operation, compared with 8 percent of the women who had had eight or more pregnancies.

No significant trends were found for any of the other operations of which there were sufficient numbers to warrant statistical consideration.

Table 39.—*Percent distribution of principal operations for delivery performed on primiparae and multiparae of each age period dying from puerperal causes who had reached the last trimester of pregnancy*

Principal operation for delivery	Primiparae					
	Total	Under 20 years	20 years, under 25	25 years, under 30	30 years, under 35	35 years and over
	Percent distribution					
Total	100	100	100	100	100	100
No operation for delivery	43	50	49	31	31	27
Forceps (without version)	24	24	22	29	23	21
Cesarean section	17	13	14	18	32	34
Version	10	8	8	14	8	15
Dilatation of cervix only	2	2	2	2	3	1
Manual removal of placenta only	2	1	2	2	2	1
Craniotomy or embryotomy	1	1	2	1	1	1
Breech extraction	1	1	1	1	1	1
Other operations	(1)	1	(1)	1	-------	-------
Type not reported	(1)	-------	(1)	-------	-------	-------

Principal operation for delivery	Multiparae							
	Total	Under 20 years	20 years, under 25	25 years, under 30	30 years, under 35	35 years, under 40	40 years, under 45	45 years and over
	Percent distribution							
Total	100	100	100	100	100	100	100	100
No operation for delivery	59	71	67	63	57	54	54	56
Forceps (without version)	10	8	9	9	10	11	11	11
Cesarean section	8	3	6	7	8	10	9	2
Version	15	7	10	14	16	16	18	21
Dilatation of cervix only	2	-------	2	1	4	2	3	2
Manual removal of placenta only	2	8	2	2	1	2	2	5
Craniotomy or embryotomy	1	1	1	1	1	2	1	2
Breech extraction	2	1	2	1	2	2	1	3
Other operations	1	-------	2	1	1	1	1	-------
Type not reported	(1)	-------	-------	(1)	-------	(1)	-------	-------

---

[1] Less than 1 percent.

The incidence of operations for delivery increased with age both for primiparae and for multiparae (table 39). Among primiparae there was a definite increase with age for Cesarean sections. Among multiparae there was a definite increase with age for versions, forceps, and Cesarean sections. The fact that the older multiparae had usually had more children probably influenced the choice of operation.

Hours in labor of primiparae and multiparae

The length of time that primiparae and multiparae who had reached the third trimester and whose deaths were preceded by the various obstetric operations had been in labor is given in table 40.

A study of this table shows that in many cases operative interference was done after very short labor. On primiparous women who died after reaching the third trimester, 59 forceps operations were done when labor had been established less than 6 hours, and 93 when labor had been in progress between 6 and 12 hours. Podalic version and extraction was done 49 times in cases of primiparae with labor of less than 6 hours, and in 31 cases with labor of 6 to 12 hours. On multiparous women 93 forceps operations were done when labor had been established less than 6 hours, and 66 when labor had lasted between 6 and 12 hours. On multiparous women podalic version and extraction was done 196 times where labor had not been established for as long as 6 hours. In 137 of these 196 cases the cervix was said to have been dilated manually or by other mechanical means. Many of these women were in convulsions or bleeding. Operative procedure aimed at delivery would seem to have been instituted prematurely in some cases.

TABLE 40.—*Hours in labor and type of principal operation for delivery performed on primiparae and multiparae dying from puerperal causes who had reached the last trimester of pregnancy*

Type of principal operation for delivery	Women dying from puerperal causes who had reached last trimester																	
	Total	Hours in labor																
		Primiparae								Multiparae								Parity not reported
		Total	None[1]	Less than 6[1]	6, less than 12	12, less than 24	24, less than 36	36 and more	Not reported	Total	None[1]	Less than 6[1]	6, less than 12	12, less than 24	24, less than 36	36 and more	Not reported	
Total	4, 965	1, 746	204	286	373	306	130	184	263	3, 041	229	1, 170	538	282	90	151	581	178
Forceps (without version)	718	408		59	93	111	58	53	34	301		93	66	59	23	32	28	9
With dilatation of cervix	*162*	*86*		*35*	*19*	*12*	*6*	*9*	*5*	*76*		*43*	*8*	*10*	*4*	*5*	*6*	
Cesarean section	531	292	133	15	20	27	19	56	22	234	116	23	14	24	13	31	13	5
Version	618	164		49	31	23	19	33	9	445		196	68	56	27	39	59	9
With dilatation of cervix	*296*	*74*		*39*	*16*	*5*	*4*	*7*	*3*	*218*		*137*	*24*	*15*	*11*	*9*	*22*	*4*
Dilatation of cervix only	108	37	2	11	14	3	2	3	2	70	5	34	13	6	3	3	6	1
Manual removal of placenta only	87	26		3	4	9	4	3	3	60		35	8	2		1	14	1
Craniotomy or embryotomy	57	22		1		7	4	8	2	35			7	9	5	11	3	
Breech extraction[2]	65	15		3	4	2	4	2		48		15	12	10	1	4	6	2
Other operation[3]	32	7	2				1	3	1	25	5	9	4	1	1	2	3	
Type not reported	9	1							1	4						1	3	4
No operation for delivery	2, 607	747	67	145	207	123	19	23	163	1, 757	103	764	345	114	17	25	389	103
No report on operation for delivery	133	27				1			26	62		1	1	1		2	57	44

[1] In the column "Less than 6" are included some cases in which there was a rapid dilatation of the cervix on a patient in whom labor had not begun. In other words, the labor in some of these cases was artificial. These cases might perhaps have been placed with equal accuracy in the column "None." The few dilatations in the "None" column were cases in which an attempt was made to induce labor by bag or bougie, but labor did not set in before the patient died.

[2] Includes 17 with dilatation of cervix.

[3] Includes 9 with dilatation of cervix.

Live births and stillbirths in forceps and in version cases

The numbers of live births and stillbirths were reported for 684 cases of forceps operations alone and with dilatation of the cervix or manual removal of the placenta or both (exclusive of versions). Of these 56 percent resulted in live births, 43 percent in stillbirths, and 1 percent in 1 live birth and 1 stillbirth. Of the 511 cases of versions alone or with dilatation of the cervix or manual removal of the placenta, or both (exclusive of versions with forceps) for which there was a report on the result of pregnancy, 35 percent terminated in live births, 63 percent in stillbirths, and 1 percent in one of each. The proportions of live births and stillbirths were undoubtedly very greatly influenced by the conditions primarily responsible for the death of the mother.

Technique of physician

The technique of the operating physician, as regards asepsis, is shown in table 41. However, in 166 cases of women who had operative deliveries the physician was preceded by a midwife or by some other nonmedical attendant who may have made vaginal examinations. In other cases he was preceded by another physician whose technique was not so careful as his own.

TABLE 41.—*Type of principal operation for delivery and technique of physician performing final operation on women dying from puerperal causes who had an operation for delivery in the last trimester of pregnancy*

Type of principal operation for delivery	Women dying from puerperal causes who had operation for delivery in last trimester										
	Total	Technique of physician reported									Technique of physician not reported
		Total	Aseptic		Attempted aseptic		Clean, not sterile		Dirty		
			Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	
Total	2, 225	2, 142	1, 328	62	275	13	450	21	89	4	83
Forceps only	518	500	215	43	76	15	181	36	28	6	18
Forceps and other operation (except version)	200	196	115	59	27	14	52	27	2	1	4
Cesarean section only	469	462	450	97	11	2	----	----	1	(2)	7
Cesarean section following other operation	62	62	55	89	7	11	----	----	----	----	----
Version only	218	210	84	40	46	22	61	29	19	9	8
Version and other operation (including forceps)	400	393	230	59	64	16	81	21	18	5	7
Dilatation of cervix	108	103	76	74	10	10	17	17	----	----	5
Manual removal of placenta	87	67	18	27	13	19	25	37	11	16	20
Craniotomy or embryotomy	57	55	34	62	9	16	9	16	3	5	2
Breech extraction	65	61	30	49	9	15	19	31	3	5	4
Other single operations	20	18	12	----	1	----	3	----	2	----	2
Other operations of more than 1 type	12	11	7	----	1	----	1	----	2	----	1
Type of operation not reported	9	4	2	----	1	----	1	----	----	----	5

[1] Not shown where number of cases was less than 50.
[2] Less than 1 percent.

The term "aseptic", which describes the technique of the principal physician in 1,328 cases, is used to indicate the usual good hospital delivery or operating-room technique, without the occurrence of reported breaks. The wearing of masks in the delivery room[3] was not inquired into and so is not implied in the term. The term "attempted aseptic", which describes 275 cases, indicates the same general technique carried out either with known breaks or under conditions in which breaks would have been very likely; "clean, not sterile", describing 450 cases, denotes ordinary cleanliness but no claim to asepsis; and "dirty", describing 89 cases, indicates usually no preparation of the patient and sometimes no preparation even of the physician's hands. It is very probable that there were more breaks in aseptic technique than are shown, especially as the physician's usual custom was given in some instances in which he did not remember his exact technique in a particular case.

---

[3] Although the use of masks in the delivery room is now considered an essential in aseptic technique it was very uncommon at the time of the study, and an inquiry on this point was therefore not included in the schedule.

Of the 1,087 operative cases in which satisfactory technique had been used throughout the delivery, death was due to puerperal septicemia in 218 cases (20 percent); of the 1,086 operative cases in which an unsatisfactory technique was known to have been used at some stage, death was due to puerperal septicemia in 337 cases (31 percent).

Onset and termination of labor

The more important of the operations of the last trimester of pregnancy intended to effect or to assist delivery may be grouped as bringing about an artificial onset or an artificial termination of labor. Cesarean section on women not in labor was arbitrarily classified as artificial onset as well as artificial termination of labor (tables 42 and 43).

By operative onset of labor is meant operative induction; by medical onset is meant induction by the use of drugs alone.

Artificial onset and artificial termination of labor were more frequent among the white than among the colored women who died. Not only did a larger proportion of colored women die undelivered, but a larger proportion died before the onset of labor. Appendix tables XIII and XIV (pp. 199, 202) show the method of onset and termination of labor among women dying of the various causes classified according to the international list. These findings are discussed in the sections on the various causes of death.

TABLE 42.—*Onset of labor among white and colored women dying from puerperal causes who had reached the last trimester of pregnancy*

Onset of labor	Women dying from puerperal causes who had reached last trimester					
	Total		White		Colored	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	4,965		4,027		938	
Onset of labor reported	**4,766**	**100**	**3,879**	**100**	**887**	**100**
Spontaneous	3,815	80	3,069	79	746	84
Artificial	687	14	618	16	69	8
Operative	[1] *650*	*14*	*589*	*15*	*61*	*7*
Medical	*34*	*1*	*28*	*1*	*6*	*1*
Method not reported	*3*	(2)	*1*	(2)	*2*	(2)
No onset	264	6	192	5	72	8
Onset of labor not reported	**199**		**148**		**51**	

[1] Includes 250 cases of Cesarean section done on women not in labor.

[2] Less than 1 percent.

TABLE 43.—*Termination of labor among white and colored women dying from puerperal causes who had reached the last trimester of pregnancy*

Termination of labor	Women dying from puerperal causes who had reached last trimester					
	Total		White		Colored	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribubution
Total	4. 965		4. 027		938	
Termination of labor reported	**4. 827**	**100**	**3, 922**	**100**	**905**	**100**
Spontaneous	2, 425	50	1, 940	49	485	54
Artificial	1, 990	41	1, 684	43	306	34
No termination [1]	412	9	298	8	114	13
Termination not reported	**138**		**105**		**33**	

[1] Includes cases in which there was no issue and in which the delivery was postmortem.

The relation of onset to termination for all the women who died after reaching the last trimester and for primiparae and multiparae is shown in table 44.

TABLE 44.—*Onset and termination of labor among primiparae and multiparae dying from puerperal causes who had reached the last trimester of pregnancy*

Onset of labor and parity	Women dying from puerperal causes who had reached last trimester				
	Total	Termination of labor			
		Spontaneous	Artificial	No termination	Not reported
Total	**4, 965**	**2, 425**	**1, 990**	**412**	**138**
Spontaneous	3, 815	2, 346	1, 345	115	9
Artificial	687	72	596	18	1
Operative	*650*	*58*	*573*	*18*	*1*
Medical	*34*	*13*	*21*		
Method not reported	*3*	*1*	*2*		
No onset	264		4	260	
No report on onset	199	7	45	19	128
Primiparae	*1, 746*	*685*	*897*	*135*	*29*
Spontaneous	1, 317	662	619	33	3
Artificial	293	23	263	6	1
Operative	*274*	*18*	*249*	*6*	*1*
Medical	*16*	*4*	*12*		
Method not reported	*3*	*1*	*2*		
No onset	90			90	
No report on onset	46		15	6	25
Multiparae	*3, 041*	*1, 674*	*1, 065*	*242*	*60*
Spontaneous	2, 408	1, 619	707	77	5
Artificial	389	49	328	12	
Operative	*372*	*40*	*320*	*12*	
Medical	*17*	*9*	*8*		
No onset	150		4	146	
No report on onset	94	6	26	7	55
Parity not reported	*178*	*66*	*28*	*35*	*49*

Prenatal care in relation to termination of labor.—Of the 1,990 women who died following operative termination of labor in the last trimester of pregnancy there was a report as to prenatal care for 1,879 (856 primiparae, 1,005 multiparae, 18 of parity not reported). Of these, 807 (326 of the primiparae, 468 of the multiparae, and 13 for whom parity was not reported) are known to have had no prenatal care. That is, 43 percent of the operative deliveries (38 percent of the operative deliveries of primiparae and 47 percent of the operative deliveries of multiparae) were of women whom the physician had not seen before labor or before the acute emergency. Of the 1,072 women who had had some prenatal care, a report on pelvic mensuration was made in 982 cases. In 349 (36 percent) of these cases both internal and external measurements had been taken (43 percent of the known primiparae and 29 percent of the known multiparae); in 253 cases (26 percent) external measurements only had been taken (31 percent of the primiparae and 21 percent of the multiparae); and in 380 cases (39 percent) no measurements had been taken (27 percent of the primiparae and 50 percent of the multiparae). There was, however, even less prenatal care, and even less pelvic mensuration included in what prenatal care was given, among the women who had spontaneous terminations of pregnancy, both primiparae and multiparae.

Use of pituitrin in relation to termination of labor.—The use of pituitrin was known to have preceded operative delivery in 381 cases, about one fifth of the operative deliveries in connection with which this information is available. Pituitrin was known to have been used before delivery in one third of the cases of artificial termination of labor in which a ruptured or inverted uterus was diagnosed either by the attending physician or at operation or autopsy.

OPERATIONS OTHER THAN FOR DELIVERY

Some operation other than for the actual delivery of the fetus or for the immediate delivery of the placenta and membranes was performed on 636 women who died after reaching the last trimester. Of these women 301 had also an operative delivery. In a few instances the two types of operations were done at the same time, in a few cases the "other" operation, usually for an accidental complication, was done before delivery, but in most of the cases the additional operations were done postpartum and were done for conditions that were the result of the delivery. The inference is that nearly half these women had operations for sequelae necessitated by complications arising from or in association with the operative delivery.

At least one blood transfusion was reported given to 219 women who died after reaching the last trimester. In 62 cases this was apparently the only operation, in 83 cases it was the only operation in addition to the operation for delivery, in 4 cases there was no report as to whether or not there had been an operative delivery; in the other cases there had also been some such operation as curettage, incision and drainage for infection, packing of the uterus, or enterostomy, following in some cases an operative and in other cases a normal delivery. The blood transfusion was more often done on account of anemia resulting from hemorrhage, but in a number of cases it was done for sepsis. Most of the deaths, however, were due to sepsis.

Packing of the uterus or the cervix was done in 138 cases, usually of women who died of puerperal hemorrhage. In 73 cases packing followed an operative delivery, and in 65 cases a normal delivery; in 14 of the former and in 3 of the latter cases some other operation also had been performed. This was most often a blood transfusion.

Curettage was done in 109 cases, usually of women who died from sepsis. It followed an operative delivery in 22 cases and a normal delivery in 82 cases; in 5 cases the type of delivery was not reported. In 16 cases there had also been blood transfusions, and in 11 cases (including 2 of the 16) there had been some other operation for sequelae of the confinement in addition to the curettage. Curettage had apparently been done after the onset of sepsis in 92 of the 100 cases of women who had curettage and who died of puerperal septicemia.

Incision and drainage for infection was the only operation performed on 35 women with spontaneous deliveries and the only operation other than for delivery performed on 10 who had had operative delivery. This operation was usually a pelvic puncture, but incisions of abscesses are also included here. In 21 other cases this operation was performed in addition to blood transfusion; in some of these cases another operation also was performed. In 8 of these 21 cases there had been an operative and in 11 a normal delivery; in 2 cases there was no report as to the type of delivery..

Laparotomy for drainage of peritonitis was done in 32 cases. Fifteen of these 32 had had operative deliveries, 13 had not, and for 4 the type of delivery was not reported.

Twenty-nine women had salpingectomy or salpingo-oophorectomy, 12 in addition to some other operation. Ten of the 29 (including 6 of the 12) had had operative deliveries, 16 had had normal deliveries, and for 3 the type of delivery was not reported. Whether the salpingectomy would have been necessary if the woman had not been pregnant was not usually very clear. In 3 cases the interval between the delivery and the salpingectomy was not reported; but in all except 5 of the remaining 26 cases the operation was performed less than 2 months after delivery—usually about a month, or less, after delivery.

Fourteen women had had appendectomies, 7 antepartum, 4 postpartum, 2 at Cesarean, and 1 at laparotomy for abdominal pregnancy. Seven of these women had operative, and seven had spontaneous deliveries. In three cases, including one of the Cesarean cases, other operative procedures also were undertaken. In some cases the appendectomy had apparently had little to do with the death, in other cases it was a factor of greater importance; but in every case the delivery had apparently had more to do with the death than the appendectomy. In some cases the appendectomy was routine; in some cases the appendicitis was apparently an accidental complication; in still other cases it was impossible to classify the interrelationship of the factors involved.

Sixteen women (10 of whom had operative deliveries) had (subsequent) enterostomy operations. In 5 cases there had been some other sequelae operation also.

Hysterectomy was done in 34 cases, 16 of which were Porro Cesarean sections and 6 were done for sepsis, 5 for ruptured uterus, 3 for amputation of an inverted uterus, and each of the other 4 for a different condition.

In 26 cases laparotomies, other than those mentioned above, were performed. Some of these were rather extensive operations at which several things were done; some were exploratory laparotomies at which no pathologic condition was found.

The other operations include 10 plastic operations on the perineum or cervix (repairs of lacerations at delivery were not ordinarily included) and various other operations, one to three of a kind, including tracheotomies, thoracotomies, and others.

A few of these operations other than for delivery were for accidental complications, but most of them were intended to alleviate conditions arising from the delivery. Most of the deaths that were preceded by these operations were from sepsis. (Appendix table XV, p. 204, gives operations other than for delivery by cause of death.)

OPERATIONS IN THE FIRST TWO TRIMESTERS

Nearly all the operative deliveries performed on women who had not reached the last trimester were classified either as therapeutic abortions or as laparotomies for ectopic gestation. (See appendix table XI, p. 196.)

Twenty-four operative deliveries before the seventh month were not called therapeutic abortions because they were performed very near the end of the second trimester and because most of them resulted in live births. They included 6 Cesarean sections, 5 forceps operations (3 after dilatation of the cervix), 4 versions (3 after dilatation of the cervix), 5 dilatations of the cervix (followed in 4 cases by spontaneous delivery, in 1 case by death without delivery), and 4 other operations. Labor was known to have begun spontaneously for 6 of these 24 women, 2 of whom were delivered by forceps, 2 by version, and 2 by other means.

LAPAROTOMY FOR ECTOPIC GESTATION

Laparatomy for ectopic pregnancy (see section Ectopic Gestation, p. 172) had been performed on 195 women who died before reaching the third trimester. One hundred and seventy of these were done on women who were in the first and 13 on women who were in the second trimester; the 12 others were probably done on women who were in the first trimester or the early part of the second. In 3 cases abdominal pregnancies of 5 or 6 months were found.

With operation not for delivery

Sixty-five women who had laparotomies for ectopic gestation in the first two trimesters had also had some other operation, in some cases performed in connection with the operation for ectopic, in other cases performed subsequently on account of sequelae of the first operation.

Six women who were operated on for ectopic gestation in the first two trimesters had hysterectomies done as part of the operation, on account of interstitial pregnancy, adhesions, fibroid uterus, or a combination of these conditions. One of these women also had a blood transfusion; another had had a diagnostic curettage.

In 13 cases the appendix was removed at the time of the operation. It was not always made clear in the interview whether or not the appendix was diseased, but in some cases the appendectomy apparently had been routine.

Fifteen women had had a curettage before the laparotomy, in some cases for diagnosis, in other cases because of a mistaken diagnosis of incomplete abortion. Five of these women had also had blood transfusions.

In all, only 26 of these 195 women who had had laparotomies for ectopic gestation before the third trimester had also had blood transfusions.

Six women had incision and drainage for infection, usually posterior colpotomy; 10 had enterostomies, including 2 who had had appendectomies.

The deaths of 52 of these 195 women were attributed to puerperal septicemia. The deaths of the other 143 were attributed to ectopic gestation; in other words, they died of hemorrhage and shock.

THERAPEUTIC ABORTIONS

Of the 205 therapeutic abortions, 84 were performed in the first trimester, 117 in the second trimester; for the other 4 the trimester was not reported. (See also Abortions, p. 107.)

Pernicious vomiting was given as the principal indication for 112 of the 205 therapeutic abortions; other toxemias, usually of a convulsive type, for 52; hemorrhage, placenta previa, or premature separation, for 14; dead fetus, for 12; and other causes, for 15.

According to the international classification, 94 of these 205 deaths were attributed to puerperal albuminuria and convulsions (which includes toxemia of pregnancy), 44 to puerperal septicemia, 32 to abortion and premature labor, 29 to other accidents of pregnancy, and 6 to other causes.

In 67 cases it was reported that the therapeutic abortion was done by means of curettage. Most of the other therapeutic abortions also were done from below. In 4 cases hysterectomy and in at least 7 cases abdominal hysterotomy was the method used.

Of the 84 cases in which therapeutic abortion in the first trimester preceded death, the fetus was delivered by means of operation in 69 cases; it was delivered spontaneously (after an operative induction) in 9 cases; and the patient died before the operation was completed in 6 cases.

Of the 117 cases of therapeutic abortion in the second trimester the fetus was delivered by means of operation in 85 cases, was delivered spontaneously (following induction) in 23 cases, and was not actually delivered before death in 7 cases; in 2 cases the method of the actual delivery of the fetus was not stated. (In these last 32 cases the induction of labor constituted the therapeutic abortion.) In the 4 cases of therapeutic abortion in which the exact period of gestation was not known the fetus was delivered by some operative means.

With operation not for delivery

Of the 205 women who had therapeutic abortions, 38 had some other operation as well. Nine women had a curettage subsequent to the therapeutic abortion (for 4 of them the therapeutic abortion also was by curettage); two women had blood transfusions in addition to the curettage. Twelve others also had blood transfusions, two of them with postpartum packing of the uterus. One other woman had postpartum packing of the uterus. Fourteen women had laparotomies subsequent to the therapeutic abortion, and two women had other operations. Most of these additional operations were for sequelae. Sepsis caused the deaths of most of these 38 women.

OPERATIONS NOT FOR DELIVERY ON WOMEN WHO HAD NO OPERATION FOR DELIVERY

At least one curettage had been done on 585 women who had had abortions other than therapeutic, or unoperated ectopic gestation.[4] (This does not include any criminal abortions that may have been done by curettage. See Abortions, p. 103.) Of these, 361 were in the first trimester, 112 in the second trimester, and for 112 the exact period of gestation was not known. Fifty of these 585 women also had blood transfusions but no other operation; 22 had laparotomy for drainage of peritonitis, including 3 that had blood transfusions also; 26 had some other incision and drainage for infection, usually posterior colpotomy (one of them had blood transfusions also); 23 had packing of the uterus; 3 had both packing of the uterus and blood transfusion; 24 had had laparotomies other than for drainage of peritonitis, and 2 had a trachelorrhaphy in addition to the curettage. The deaths of most of these women were due to sepsis.

Nine women who had had abortions other than therapeutic had hysterectomies. In 2 cases evidence of preceding pregnancy was discovered at the pathological examination of the uteri, 1 of which had been removed for fibroids, the other for "chronic pelvic inflammation." Both these women also had other operations later. Five of the 9 hysterectomies were performed on patients who had had self-induced abortions—2 because the uterus had been punctured, and 3 because of sepsis. One other hysterectomy was performed for fibroid uterus 6 days after an abortion and one for chronic atrophic endometritis 4½ months after an abortion. This last death was attributed to shock; the other eight women died of sepsis.

Fifty-three women who died before reaching the last trimester had blood transfusions as their only operation. Most of these deaths were due to sepsis.

Eighty-two who had no operation for delivery and no curettage had laparotomies other than hysterectomy, including 34 laparotomies for drainage of peritonitis (4 with blood transfusions also), 13 salpingectomies or salpingo-oophorectomies, 7 appendectomies, 8 enterostomies, and 20 others. Most of these operations except the appendectomies were for sequelae, and most of the deaths were due to sepsis.

Forty-one women had incisions and drainage for infection only and 7 had some other operation in addition; 27 had packing of the uterus or cervix; 8 had some other operation or other combination of operations; and 5 had some operation the type of which was not reported.

For operations other than for delivery, by cause of death, see appendix table XV, p. 204.

ONSET AND TERMINATION OF LABOR IN THE FIRST TWO TRIMESTERS

The methods of onset and of termination of labor in the first two trimesters are given in tables 45, 46, and 47. Induced abortions other than therapeutic are included in these tables for completeness, although they are not considered "operations" in this report. Women with ectopic gestation were arbitrarily classified as having no onset and no termination.

By operative onset of labor is meant operative induction; by medical is meant induction by the use of drugs alone. For onset and termination of labor, by cause of death, see appendix tables XIII and XIV, pp. 199, 202.

---

[4] There were also 1 premature live birth and 1 hydatidiform mole.

TABLE 45.—*Onset and termination of labor among women dying from puerperal causes who had not reached the last trimester of pregnancy*

Onset of labor	Women dying from puerperal causes who had not reached last trimester						
	Total	Termination of labor					
		Spontaneous	Artificial			No termination [2]	Not reported
			Total	Induced abortion [1]	Other		
Total	**2,381**	**1,005**	**265**	**56**	**209**	**560**	**551**
Spontaneous	598	521	34		34	8	35
Artificial	999	419	219	55	164	35	326
Operative	*729*	*300*	*214*	*51*	*163*	*30*	*185*
Induced abortion [1]	514	264	51	51		16	183
Other	215	36	163		163	14	2
Medical	*30*	*15*	*2*	*1*	*1*	*3*	*10*
Induced abortion [1]	28	15	1	1		3	9
Other	2		1		1		1
Method not reported [3]	*240*	*104*	*3*	*3*		*2*	*131*
No onset [2]	515		3		3	512	
Onset not reported	269	65	9	1	8	5	190
FIRST TRIMESTER							
Total	**1,299**	**546**	**113**	**31**	**82**	**332**	**308**
Spontaneous	273	242	11		11	3	17
Artificial	598	266	100	31	69	21	211
Operative	*425*	*190*	*97*	*28*	*69*	*16*	*122*
Induced abortion	341	181	28	28		10	122
Other	84	9	69		69	6	
Medical (induced abortion [1])	*19*	*10*	*1*	*1*		*3*	*5*
Method not reported (induced abortion [1])	*154*	*66*	*2*	*2*		*2*	*84*
No onset [2]	306					306	
Onset not reported	122	38	2		2	2	80
SECOND TRIMESTER							
Total	**672**	**310**	**133**	**12**	**121**	**181**	**48**
Spontaneous	244	212	21		21	4	7
Artificial	217	82	102	11	91	13	20
Operative	*187*	*61*	*101*	*11*	*90*	*13*	*12*
Induced abortion [1]	61	35	11	11		5	10
Other	126	26	90		90	8	2
Medical	*6*	*3*	*1*		*1*		*2*
Induced abortion [1]	4	3					1
Other	2		1		1		1
Method not reported [3]	*24*	*18*					*6*
No onset [2]	165		3		3	162	
Onset not reported	46	16	7	1	6	2	21

---

[1] Other than therapeutic.

[2] Includes ectopic gestation.

[3] All induced abortions except 1 with spontaneous termination.

TABLE 45.—*Onset and termination of labor among women dying from puerperal causes who had not reached the last trimester of pregnancy*—Continued

Onset of labor	Women dying from puerperal causes who had not reached last trimester						
	Total	Termination of labor					
		Spontaneous	Artificial			No termination	Not reported
			Total	Induced abortion	Other		
FIRST 2 TRIMESTERS, NOT OTHERWISE SPECIFIED							
Total	**410**	**149**	**19**	**13**	**6**	**47**	**195**
Spontaneous	81	67	2	-	2	1	11
Artificial	184	71	17	13	4	1	95
Operative	*117*	*49*	*16*	*12*	*4*	*1*	*51*
Induced abortion [1]	112	48	12	12	-	1	51
Other	5	1	4	-	4	-	-
Medical (induced abortion [1])	*5*	*2*	-	-	-	-	*3*
Method not reported (induced abortion [1])	*62*	*20*	*1*	*1*	-	-	*41*
No onset [2]	44	-	-	-	-	44	-
Onset not reported	101	11	-	-	-	1	89

[1] Other than therapeutic.

[2] Includes ectopic gestation.

TABLE 46.—*Onset of labor among white and colored women dying from puerperal causes who had not reached the last trimester of pregnancy*

Onset of labor and trimester of pregnancy	Women dying from puerperal causes who had not reached last trimester		
	Total	White	Colored
Total	**2,381**	**2,025**	**356**
First trimester	*1,299*	*1,144*	*155*
Spontaneous	273	225	48
Artificial	598	557	41
Operative	*425*	*406*	*19*
Medical	*19*	*17*	*2*
Method not reported	*154*	*134*	*20*
No onset [1]	306	266	40
Onset not reported	122	96	26
Second trimester	*672*	*536*	*136*
Spontaneous	244	194	50
Artificial	217	190	27
Operative	*187*	*166*	*21*
Medical	*6*	*5*	*1*
Method not reported	*24*	*19*	*5*
No onset [1]	165	125	40
Onset not reported	46	27	19
First 2 trimesters, not otherwise specified	*410*	*345*	*65*

[1] Includes ectopic gestation.

TABLE 47.—*Termination of labor among white and colored women dying from puerperal causes who had not reached the last trimester of pregnancy*

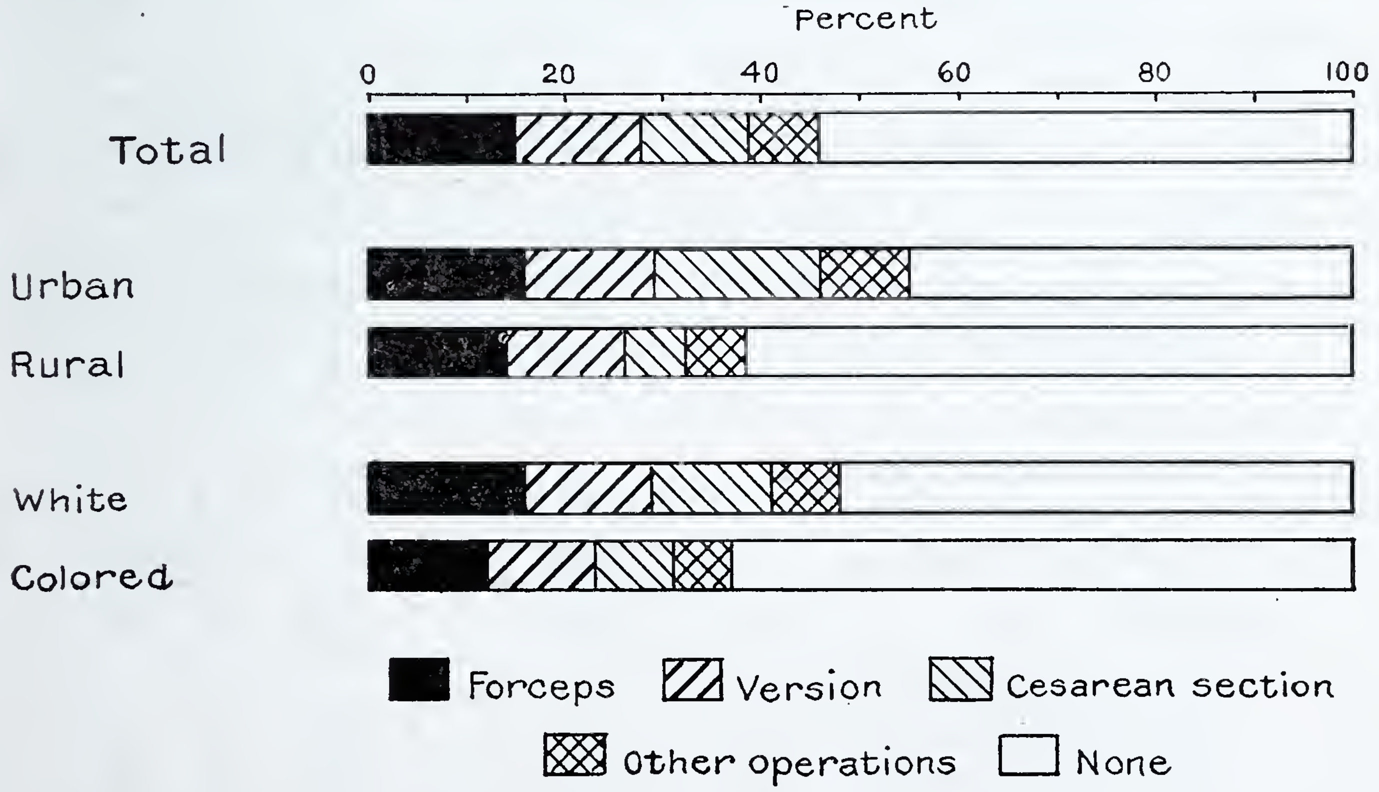
Termination of labor and trimester of pregnancy	Women dying from puerperal causes who had not reached last trimester		
	Total	White	Colored
Total	**2,381**	**2,025**	**356**
First trimester	*1,299*	*1,144*	*155*
Spontaneous	546	474	72
Artificial	113	108	5
No termination [1]	332	290	42
Termination not reported	308	272	36
Second trimester	*672*	*536*	*136*
Spontaneous	310	248	62
Artificial	133	116	17
No termination [1]	181	137	44
Termination not reported	48	35	13
First 2 trimesters, not otherwise specified	*410*	*345*	*65*

[1] Includes ectopic gestation.

INCIDENCE OF OPERATIVE DELIVERIES

The deaths of white women were more often preceded by operative delivery than those of colored women, and death was more often preceded by an operative delivery in the urban than in the rural districts. This is shown in table 48. The differences in urban and rural areas are chiefly in laparotomy for ectopic gestation and Cesarean section, there being more in urban than in rural areas. Among white and colored women the differences are chiefly in therapeutic abortion, Cesarean section, and forceps operations.

CHART VI.—OPERATIONS FOR DELIVERY IN THE LAST TRIMESTER OF PREGNANCY AMONG WOMEN DYING FROM PUERPERAL CAUSES



The proportion of the maternal deaths that were preceded by operations for delivery varied in the different States. Some operation for delivery preceded 50 percent of the maternal deaths in New Hampshire but only 27 percent of those in Oklahoma. In Nebraska 39 percent of the deaths were preceded by an operation for delivery; in 7 States there were more, and in 7 States less, than this percentage (table 49). The percentage of operative deliveries in the last trimester ranged from 34 in Alabama to 57 in California and Wisconsin. (For incidence of specific operations among women who died in the different States see appendix table XVI, p. 206.)

Whether the incidence of the various operations among this group of women who died was greater or less than the incidence of operations among women who lived cannot be determined. If these figures are to be compared with other figures on operative incidence, such as those in hospitals or in the practice of individual physicians, for instance, the percentages based on the women who had reached the last trimester of pregnancy should probably be used.

TABLE 48.—*Trimester of pregnancy and type of principal operation for delivery performed on white and colored women dying from puerperal causes in urban and rural areas*

TOTAL

Trimester of pregnancy and principal operation for delivery	Women dying from puerperal causes					
	Total		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	7,380		3,462		3,918	
First trimester	1,299		739		560	
Report on operation for delivery	**1,298**	**100**	**738**	**100**	**560**	**100**
No operation	*1,044*	*80*	*576*	*78*	*468*	*84*
Operation	*254*	*20*	*162*	*22*	*92*	*16*
Laparotomy for ectopic gestation	170	13	120	16	50	9
Therapeutic abortion	84	6	42	6	42	8
No report on operation	**1**		**1**			
Second trimester	672		332		340	
Report on operation for delivery	**668**	**100**	**332**	**100**	**336**	**100**
No operation	*514*	*77*	*252*	*76*	*262*	*78*
Operation	*154*	*23*	*80*	*24*	*74*	*22*
Laparotomy for ectopic gestation	13	2	9	3	4	1
Therapeutic abortion	117	18	58	17	59	18
Cesarean section	6	1	5	2	1	(1)
Other operation	18	3	8	2	10	3
No report on operation	**4**				**4**	
First two trimesters, not otherwise specified	410		236		174	
Last trimester	4,965		2,148		2,817	
Report on operation for delivery	**4,832**	**100**	**2,087**	**100**	**2,745**	**100**
No operation	*2,607*	*54*	*935*	*45*	*1,672*	*61*
Operation	*2,225*	*46*	*1,152*	*55*	*1,073*	*39*
Laparotomy for ectopic gestation	8	(1)	3	(1)	5	(1)
Cesarean section	531	11	358	17	173	6
Craniotomy or embryotomy	57	1	31	1	26	1
Podalic version	618	13	281	13	337	12
Forceps (other than version)	718	15	332	16	386	14
Other operation	293	6	147	7	146	5
No report on operation	**133**		**61**		**72**	
Trimester of pregnancy not reported	34		7		27	

[1] Less than 1 percent.

Table 48.—*Trimester of pregnancy and type of principal operation for delivery performed on white and colored women dying from puerperal causes in urban and rural areas*—Continued

WHITE

Trimester of pregnancy and principal operation for delivery	Women dying from puerperal causes					
	Total		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	6, 072	-------	2, 951	-------	3, 121	-------
First trimester	1, 144	-------	665	-------	479	-------
Report on operation for delivery	**1, 143**	**100**	**664**	**100**	**479**	**100**
No operation	*909*	*80*	*513*	*77*	*396*	*83*
Operation	*234*	*20*	*151*	*23*	*83*	*17*
Laparotomy for ectopic gestation	154	13	109	16	45	9
Therapeutic abortion	80	7	42	6	38	8
No report on operation	**1**	-------	**1**	-------	-------	-------
Second trimester	536	-------	271	-------	265	-------
Report on operation for delivery	**535**	**100**	**271**	**100**	**264**	**100**
No operation	*398*	*74*	*198*	*73*	*200*	*76*
Operation	*137*	*26*	*73*	*27*	*64*	*24*
Laparotomy for ectopic gestation	10	2	7	3	3	1
Therapeutic abortion	106	20	55	20	51	19
Cesarean section	5	1	4	1	1	(1)
Other operation	16	3	7	3	9	3
No report on operation	**1**	-------	-------	-------	**1**	-------
First two trimesters, not otherwise specified	345	-------	207	-------	138	-------
Last trimester	4, 027	-------	1, 805	-------	2, 222	-------
Report on operation for delivery	**3, 926**	**100**	**1, 753**	**100**	**2, 173**	**100**
No operation	*2, 040*	*52*	*762*	*43*	*1, 278*	*59*
Operation	*1, 886*	*48*	*991*	*57*	*895*	*41*
Laparotomy for ectopic gestation	6	(1)	2	(1)	4	(1)
Cesarean section	456	12	306	17	150	7
Craniotomy or embryotomy	44	1	23	1	21	1
Podalic version	514	13	238	14	276	13
Forceps (other than version)	613	16	292	17	321	15
Other operation	253	6	130	7	123	6
No report on operation	**101**	-------	**52**	-------	**49**	-------
Trimester of pregnancy not reported	20	-------	3	-------	17	-------

---

[1] Less than 1 percent.

TABLE 48.—*Trimester of pregnancy and type of principal operation for delivery performed on white and colored women dying from puerperal causes in urban and rural areas*—Continued

COLORED

Trimester of pregnancy and principal operation for delivery	Women dying from puerperal causes					
	Total		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	1,308		511		797	
First trimester	155		74		81	
Report on operation for delivery	**155**	**100**	**74**	**100**	**81**	**100**
No operation	*135*	*87*	*63*	*85*	*72*	*89*
Operation	*20*	*13*	*11*	*15*	*9*	*11*
Laparotomy for ectopic gestation	16	10	11	15	5	6
Therapeutic abortion	4	3			4	5
Second trimester	136		61		75	
Report on operation for delivery	**133**	**100**	**61**	**100**	**72**	**100**
No operation	*116*	*87*	*54*	*89*	*62*	*86*
Operation	*17*	*13*	*7*	*11*	*10*	*14*
Laparotomy for ectopic gestation	3	2	2	3	1	1
Therapeutic abortion	11	8	3	5	8	11
Cesarean section	1	1	1	2		
Other operation	2	2	1	2	1	1
No report on operation	**3**				**3**	
First two trimesters, not otherwise specified	65		29		36	
Last trimester	938		343		595	
Report on operation for delivery	**906**	**100**	**334**	**100**	**572**	**100**
No operation	*567*	*63*	*173*	*52*	*394*	*69*
Operation	*339*	*37*	*161*	*48*	*178*	*31*
Laparotomy for ectopic gestation	2	(1)	1	(1)	1	(1)
Cesarean section	75	8	52	16	23	4
Craniotomy or embryotomy	13	1	8	2	5	1
Podalic version	104	11	43	13	61	11
Forceps (other than version)	105	12	40	12	65	11
Other operation	40	4	17	5	23	4
No report on operation	**32**		**9**		**23**	
Trimester of pregnancy not reported	14		4		10	

[1] Less than 1 percent.

TABLE 49.—*Frequency of operation for delivery among all women who died from puerperal causes and among those who died after reaching the last trimester of pregnancy for whom there was a report on operation for delivery; each State included in the study*

State	Women dying from puerperal causes for whom there was a report on operation for delivery					
	All trimesters			Last trimester		
	Total	Operation		Total	Operation	
		Number	Percent		Number	Percent
Total	7,211	2,649	37	4,832	2,225	46
Alabama	1,061	305	29	818	280	34
California	488	210	43	305	174	57
Kentucky	638	192	30	422	162	38
Maryland	378	153	40	252	132	52
Michigan	1,284	473	37	783	387	49
Minnesota	479	192	40	328	145	44
Nebraska	322	127	39	193	107	55
New Hampshire	108	54	50	78	42	54
North Dakota	157	51	32	104	37	36
Oklahoma	284	78	27	179	66	37
Oregon	176	70	40	96	51	53
Rhode Island	161	66	41	109	56	51
Virginia	764	280	37	564	253	45
Washington	310	114	37	164	83	51
Wisconsin	601	284	47	437	250	57

COMMENT BY ADVISORY COMMITTEE

In this series of cases all the women died (and many of the babies), and, therefore, it is a record of failure. One cannot say that the operative procedures followed in many cases caused the deaths, but analysis of these procedures leads to many criticisms of the management of these cases.

The physicians who delivered these cases cannot be blamed in all cases for the results obtained, for in 43 percent of the operative deliveries they had not seen the women before labor or before the acute emergency had occurred. Under these circumstances it is a well-recognized fact that the operation of election is not always possible; the physician many times is forced to do something which he appreciates may not be the best but which, at the time, seems justifiable. This shows, from another point of view, the absolute necessity, if maternal mortality is to be lowered, of insisting upon continuous prenatal and adequate delivery care.

In a study of this type the physician's ability to do well the operation he has chosen can be evaluated only by the results, which show that many of the operations either were badly chosen or were poorly done. In nearly 40 percent of these operative deliveries it was admitted by the physicians that their technique was at least unsatisfactory with regard to asepsis. It is therefore not to be wondered at that 26 percent of the deaths following forceps deliveries and 19 percent of the deaths following versions were due to sepsis. Had those women whose deaths were assigned to eclampsia and placenta previa lived longer, many of them also would probably have died of sepsis. An operative delivery is a surgical procedure and should not be undertaken by physicians untrained in surgical technique. It is evident that many of these physicians did not have such training.

Many of these patients were operated upon after very little or no labor, and this explains the frequency of artificial dilatation of the cervix in both forceps and version deliveries. The number of cases in which manual dilatation of the cervix, forceps or version, and manual removal of the placenta occurred, or forceps failed and version was done, was deplorably large. From this it is evident that accouchement forcé was resorted to many times, and accouchement forcé is not regarded as good obstetrics today; it gives bad results and should not be performed.

That attempts at delivery by vagina were followed by Cesarean section in 62 cases is to be noted and condemned. (For further comment on the Cesarean sections done in this series see p. 98.)

That 57 women died following delivery by craniotomy or embryotomy shows clearly the lack of care these women had.

The frequency with which a curettage was done on women who had developed sepsis is surprising, for such treatment has long been condemned. Secondary operations for various conditions, usually of a septic nature, were much too common.

Most of the operative deliveries in the first two trimesters were classified either as therapeutic abortions or as laparotomies for ectopic pregnancy. The main comment on the deaths occurring from these two conditions is made in their respective sections, but a few comments may be made here. The removal of the appendix at the time of operation for an ectopic gestation is not good surgery. The fact that of the 195 women who had had a laparotomy for ectopic gestation only 26 had transfusion is to be noted. It must be recognized that preparation to transfuse is almost as essential as operation in ectopic pregnancy. That 52 women died of sepsis shows clearly how perfect one's technique should be if sepsis is to be avoided.

It is to be expected that the operative incidence would be higher in a group of fatal cases such as those included in the present study than among women who survived. Without having all the data for all areas studied it would be difficult to draw too many absolute conclusions. Necessarily the more serious operations would make up a higher percentage in a mortality study than the less dangerous operations.

CESAREAN SECTION

Cesarean section—that is, an abdominal operation to remove a viable fetus through a uterine incision—preceded 537 (7 percent) of the 7,211 deaths of women for whom information concerning operation for delivery was obtained. In nearly every case the operation performed was of the classical type. The Cesarean sections included 6 on women who had not reached the last trimester, which resulted in live births. Abdominal hysterotomies before the time of viability were classified as therapeutic abortions. (See p. 79.) The 531 deaths following Cesarean section in the last trimester of pregnancy constituted 11 percent of the 4,832 deaths among women who had reached this period and for whom information as to operation for delivery was obtained, and 24 percent of the 2,216 deaths of women who had reached this period and who had had an operation for delivery, the type of which was reported.

CAUSE OF DEATH

For these women who died following Cesarean section the number of deaths from each cause as given on interview by the attendant physicians was as follows according to the international classification: Accidents of pregnancy, 3; puerperal hemorrhage, 42; other accidents of labor, 146 (including Cesarean section, 136); puerperal septicemia, 143; puerperal albuminuria and convulsions, 202. One death, that of a patient who had apparently entirely recovered from her operation before she died of embolism, was attributed to puerperal phlegmasia alba dolens, embolus, sudden death. The 136 deaths attributed to Cesarean section include deaths said to have been due to shock, embolism, ileus, pneumonia, or similar complications following Cesarean section, or to chronic cardiac or nephritic disease and Cesarean section. (For the opinion of the consulting committee as to the immediate causes of the deaths following Cesarean section, see table 56 and p. 100.)

INDICATIONS FOR OPERATION

The indications given by the attending physician for Cesarean sections are shown in the accompanying list. Combinations of indications were frequent; in one fourth of the cases more than one indication was given. Eclampsia, the most frequent indication, was given alone or in combination in 165 cases. Contracted pelvis was reported as the indication in 107 cases, in all but 28 of which it was one of a combination. This probably does not represent the true number of women with contracted pelvis in the group. In some of the 61 cases in which the principal indication was given as disproportion or long or difficult labor the reason for the dystocia was probably a contracted pelvis. On the other hand, not all the diagnoses of contracted pelvis were made by means of internal and external pelvic mensuration. Preeclamptic toxemia was given as the indication in 47 cases, uremia in 27, and placenta previa in 38. Twenty-five of these 537 women are known to have had previous Cesarean sections, but this was given as the sole indication in only 6 cases and as the principal indication in 17. One of the women who had ruptured uterus as an indication and another who had ruptured uterus discovered at operation had had previous Cesarean sections.

The principal indications for Cesarean sections among the urban and rural and the white and colored women are shown in table 50.

Indication for operation as given by attending physician	Women who died following Cesarean section	
Total		537
Toxic conditions		239
Eclampsia	165	
Alone	156	
With contracted pelvis	2	
With abnormal presentation (breech)	1	
With disproportion	2	
With long or difficult labor	2	
In elderly primipara	1	
With lobar pneumonia	1	
Preeclampsia	47	
Alone	30	
With contracted pelvis	7	
With abnormal presentation (breech)	1	
With disproportion (overdue)	1	
With long labor	3	
In elderly primipara	1	
Overdue	1	
With myocarditis (had previous Cesarean)	1	
With chronic endocarditis	1	
With fibroids	1	
Uremia	27	
Alone (includes 1 with previous Cesarean)	24	
With contracted pelvis (had previous Cesarean)	1	
With contracted pelvis and for sterilization	1	
In elderly primipara	1	
Conditions associated with hemorrhage		62
Placenta previa	38	
Alone	32	
With chronic nephritis	1	
With previous Cesarean and heart lesion	1	
With contracted pelvis	2	
In elderly primipara	1	
With lobar pneumonia	1	
Premature separation of placenta (includes 3 with previous Cesarean)	15	
Ruptured uterus (includes 1 with previous Cesarean)	9	
Previous Cesarean section		17
Alone	6	
With contracted pelvis	11	

Indication for operation as given by attending physician		Women who died following Cesarean section
Absolute and relative disproportion		144
Contracted pelvis	83	
Alone	28	
With abnormal presentation (1 brow, 2 breech, 2 transverse, and 2 occipito-posterior position)	7	
With abnormal presentation (transverse) in elderly primipara	1	
With long or difficult labor	25	
With long or difficult labor in elderly primipara	1	
In elderly primipara	5	
With dry labor	1	
Overdue	2	
With twin pregnancy and myocarditis	1	
With previous destructive operation	4	
With previous difficult labor	6	
With fibroids	1	
With hyperthyroidism	1	
Disproportion	17	
Alone	11	
With long or difficult labor	4	
Overdue	1	
With previous operative delivery	1	
Long or difficult labor	44	
Alone	36	
In elderly primipara	8	
Abnormal presentation		33
Alone (1 face, 1 breech, 4 transverse, 6 posterior position)	12	
With long or difficult labor (1 brow, 2 face, 5 breech, 7 transverse, 1 foot)	16	
In elderly primipara (4 breech, 1 transverse)	5	
Other indication		39
Scarred or rigid cervix	5	
Hydrocephalus	4	
Tumor	4	
Overdue	3	
Bicornuate uterus	1	
Tumor in elderly primipara	1	
Elderly primipara	1	
Elderly primipara and Banti's disease	1	
Previous difficult labor	1	
Sterilization	1	
Previous destructive operation and sterilization	1	
Prolapsed cord	1	
Cardiac disease	6	
Chorea	2	
Pyelitis	2	
Hematuria	1	
Diabetes	1	
Postoperative intestinal obstruction	1	
Mother's condition hopeless—"to save child"	2	
Not reported		3

A toxic condition was the principal indication for 239 (45 percent) of all the Cesarean sections; 151 (42 percent) of those performed on women who died in the urban areas and 88 (51 percent) of those who died in the rural areas; in 200 (44 percent) of the white and in 39 (51 percent) of the colored cases. Conditions associated with hemorrhage gave the indication in a larger proportion of the cases of white than of colored women. Absolute or relative disproportion was the indication in a larger proportion of the cases of urban than of rural women and in a larger proportion of the cases of colored than of white women.

Table 50.—*Principal indication for Cesarean section among white and colored women and women in urban and rural areas who died following Cesarean section*

Principal indication for Cesarean section	Women who died following Cesarean section									
	Total		White		Colored		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	537	------	461	------	76	------	363	------	174	------
Report on indication	**534**	**100**	**458**	**100**	**76**	**100**	**363**	**100**	**171**	**100**
Eclampsia	165	31	133	29	32	42	99	27	66	39
Preeclampsia	47	9	45	10	2	3	37	10	10	6
Uremia	27	5	22	5	5	7	15	4	12	7
Placenta previa	38	7	37	8	1	1	26	7	12	7
Premature separation of placenta	15	3	14	3	1	1	12	3	3	2
Ruptured uterus	9	2	7	2	2	3	8	2	1	1
Previous Cesarean	17	3	17	4	------	------	16	4	1	1
Contracted pelvis	28	5	23	5	5	7	23	6	5	3
Contracted pelvis and other indication	55	10	44	10	11	14	42	12	13	8
Abnormal presentation	33	6	30	7	3	4	21	6	12	7
Disproportion and long or difficult labor	61	11	51	11	10	13	40	11	21	12
Other indication	39	7	35	8	4	5	24	7	15	9
No report on indication	**3**	------	**3**	------	------	------	------	------	**3**	------

Among the primiparae a toxic condition was given as the indication for 52 percent of the Cesarean sections, absolute or relative disproportion (including long labor) for 31 percent, abnormal presentation for 8 percent, conditions associated with hemorrhage for 5 percent, and other indications for 5 percent. A toxic condition was the indication for 36 percent of the operations among the multiparae, absolute or relative disproportion for 22 percent, conditions associated with hemorrhage for 19 percent, previous Cesarean for 7 percent, abnormal presentation for 5 percent, other indications for 10 percent. (See table 57, p. 102.)

PARITY AND AGE

The number and percentage of women who had had various numbers of pregnancies and whose deaths were preceded by Cesarean section are given in table 51. Deaths followed Cesarean section in the cases of 13 percent of the primiparae, 8 percent of the secundiparae, 5 percent of the women who had had 3 to 5 pregnancies, and 4 percent of those who had had 6 or more pregnancies. In primiparae the proportion of deaths that were preceded by Cesarean section rose from 10 percent of those under 25 years of age, through 13 percent of those from 25 to 29, to 23 percent of those from 30 to 34 and of those 35 and over. When the percentages are based only on those

TABLE 51.—*Number of pregnancies and frequency of Cesarean section among women for whom there was a report on operation for delivery, who died from puerperal causes and who died after reaching the last trimester of pregnancy*

Number of pregnancies	Women dying from puerperal causes for whom there was a report on operation for delivery					
	All trimesters			Last trimester		
	Total	Cesarean section		Total	Cesarean section	
		Number	Percent		Number	Percent
Total	7, 211	537	7	4, 832	531	11
1	2, 303	293	13	1, 719	292	17
2	907	76	8	619	74	12
3 to 5	1, 748	96	5	1, 143	95	8
6 or more	1, 310	56	4	1, 022	54	5
Multiparae, number not specified	491	11	2	195	11	6
Not reported	452	5	1	134	5	4

who died after reaching the last trimester, it is found that the deaths of 17 percent of all primiparae and 33 percent of primiparae of 30 or older were preceded by Cesarean section. Although the deaths of 84 of these women of 30 and over, and of 34 women of 35 and over, were preceded by Cesarean section, in only 27 cases was elderly primiparity given as an indication for the operation, usually with some other indication.

TABLE 52.—*Frequency of Cesarean section in each age period among all primiparae and multiparae dying from puerperal causes and among those dying after they had reached the last trimester for whom there was a report on operation for delivery*

Age period	Women dying from puerperal causes for whom there was a report on operation for delivery									
	All women			Primiparae			Multiparae			Parity not reported
	Total	Cesarean section		Total	Cesarean section		Total	Cesarean section		
		Number	Percent		Number	Percent[1]		Number	Percent	
Total	7, 211	537	7	2, 303	293	13	4, 456	239	5	452
Under 20 years	864	75	9	733	73	10	116	2	2	15
20 years, under 25	1, 506	106	7	787	82	10	618	23	4	101
25 years, under 30	1, 503	100	7	405	54	13	983	44	4	115
30 years, under 35	1, 388	108	8	217	50	23	1, 074	58	5	97
35 years, under 40	1, 272	101	8	112	23	21	1, 067	76	7	93
40 years, under 45	558	45	8	32	10	-------	503	35	7	23
45 years and over	93	2	2	4	1	-------	84	1	1	5
Not reported	27	-------	-------	13	-------	-------	11	-------	-------	3
	Women dying from puerperal causes who had reached last trimester and for whom there was a report on operation for delivery									
Total	4, 832	531	11	1, 719	292	17	2, 979	234	8	134
Under 20 years	642	74	12	566	72	13	72	2	3	4
20 years, under 25	1, 009	105	10	591	82	14	393	22	6	25
25 years, under 30	940	98	10	299	54	18	616	42	7	25
30 years, under 35	874	108	12	155	50	32	687	58	8	32
35 years, under 40	870	100	11	77	23	30	758	75	10	35
40 years, under 45	413	44	11	22	10	-------	381	34	9	10
45 years and over	67	2	3	2	1	-------	63	1	2	2
Not reported	17	-------	-------	7	-------	-------	9	-------	-------	1

---

[1] Not shown where number of primiparae was less than 50.

The percentage of the deaths of multiparae in the various age groups whose deaths were preceded by Cesarean section also increased with age, as is shown in table 52.

DURATION OF LABOR

The duration of labor was reported for the 495 women dying after they reached the last trimester of pregnancy whose deaths were preceded by Cesarean section. Of these, 250 were not in labor at the time of the operation. The cause of death for 59 percent of these women not in labor was puerperal albuminuria and convulsions, for 12 percent puerperal hemorrhage, and for 11 percent puerperal septicemia. Evidently most of the Cesarean sections that were done on women not in labor were for hemorrhage or eclampsia or pre-eclampsia.

Of the 245 women in labor at the time of the operation for whom the number of hours was reported 38 had been in labor less than 6 hours; 35, from 6 to 12 hours; 51, from 12 to 24 hours; 32, from 24 to 36 hours; and 89, more than 36 hours. With the duration of labor the percentage of the deaths that were attributed to puerperal septicemia rose rapidly from 29 percent of those in labor less than 12 hours to 51 percent for those in labor 36 hours or more. But it must be remembered that all these women died—and many died in shock so soon after the operation that they did not have time to develop sepsis. This was particularly true of those cases in which the Cesarean section was done on account of eclampsia, placenta previa, or premature separation of the placenta, and it was in these cases, largely, that Cesarean sections were done early in labor or on patients not in labor.

RUPTURE OF MEMBRANES

Of the 491 cases in which there was a report on rupture of the membranes, for women dying after Cesarean section was done in the last trimester, the bag of waters had not ruptured in 324 cases (66 percent). The membranes had been ruptured artificially in 34 of the other 167 cases, they had ruptured spontaneously in 109 cases, and there was no report on this point in 24 cases. Of the 324 women with unruptured membranes, 15 percent died of puerperal septicemia; 51 percent of albuminuria and convulsions; 10 percent of hemorrhage; and the rest of other causes. Of the 167 women with ruptured membranes, 49 percent died of puerperal septicemia; 14 percent of albuminuria and convulsions; 4 percent of puerperal hemorrhage; and the rest of other causes.

PLANNED AND EMERGENCY OPERATIONS

Eighty-two of the 537 Cesarean sections were planned, and 452 were emergency operations (i.e., not previously planned); in 3 cases there was no report on this point. All except 4 of these operations were done in hospitals or maternity homes; for 1 there was no report as to hospitalization.

ATTEMPTS AT OTHER OPERATIONS

Cesarean section followed attempts at some other form of operative delivery in 62 cases. Forty-two of these women were primiparae.

ATTENDANTS PRECEDING OPERATOR

Of the 531 women who died after Cesarean section in the last trimester 2 had been attended by osteopaths not listed in the medical directory, 14 by midwives, and 2 by neighbors before a physician was called. In 1 case the Cesarean was done by an osteopath not listed in the medical directory. In 12 cases an interne or a medical student was originally in charge of the case; in 1 of the 12 cases the operation was performed by an interne. In many cases in which the women had been attended only by physicians the operating surgeon was a consultant. Sometimes 2 or 3 physicians—in some cases preceded by a midwife—had been successively in charge before the operating surgeon.

TECHNIQUE OF OPERATOR

The technique of the operating surgeon was reported as aseptic in 505 cases of women dying after they reached the last trimester; as attempted aseptic but with known "breaks" or under conditions that made actual asepsis unlikely, in 18 cases; as showing no attempt at asepsis, in 1 case of a moribund woman. In 7 cases there was no report on the operator's technique.

Vaginal examinations by the operating physician preceded the Cesarean section in 254 cases, or 52 percent of the 485 women dying after they reached the last trimester concerning whom information was secured. Ninety-six women (20 percent) had had one vaginal examination, 46 (9 percent) had had two vaginal examinations, 71 (15 percent) had had three or more, and for 41 (8 percent) the number of examinations was not reported. These were in addition to any examinations that may have been made by preceding physicians or midwives. Of the 231 women who had had no vaginal examinations by the operator, 20 percent died of sepsis, 43 percent of albuminuria and convulsions, and the rest of other causes. Of the 254 women who had had vaginal examinations by the operator, 34 percent died of sepsis, 30 percent of albuminuria and convulsions, and the rest of other causes.

Of the 512 women who had Cesareans and who had been attended only by physicians (including internes and medical students) there was a report on vaginal examinations by the operator for all but 45; 239 had one or more vaginal examinations by the operator, 228 had none. In 225 of the 239 cases the operator used aseptic technique, but in 83 of these 225 cases he had been preceded by another physician with less careful technique. Of these 83 women, 43 percent died of sepsis, 16 percent of albuminuria and convulsions, the rest of other causes. Of the 142 cases in which aseptic technique had been used throughout, 30 percent of the deaths were from sepsis, 37 percent from albuminuria and convulsions, and the rest from other causes. In the 211 cases in which there was no vaginal examination at the time of delivery as far as was known and in which aseptic technique was thought to have been used throughout, 19 percent of the deaths were due to sepsis, 44 percent to albuminuria and convulsions, and the rest to other causes. Of these 211 women 84 had had rectal examinations (30 percent of these died of sepsis), 101 had had no rectal examinations (11 percent died of sepsis), and for 26 there was no report as to rectal examination.

LIVE BIRTHS AND STILLBIRTHS

Live-born infants resulted from 393 (74 percent) of these Cesarean sections; in 1 of the cases there was a live birth and a stillbirth. In three cases information as to live births or stillbirths was not obtained. It must be remembered that these live births include all that were alive at time of delivery; data on neonatal mortality were not obtained. The principal indications for Cesarean section and live births and stillbirths resulting are shown in table 53. The proportion of live births to stillbirths was greater for the women who had had previous Cesarean, contracted pelvis alone, or preeclampsia as the indication for the operation. The proportion of stillbirths to live births was highest for those Cesareans for which the indication was premature separation of the placenta or ruptured uterus.

TABLE 53.—*Principal indication for Cesarean section and result of pregnancy among women who died following Cesarean section*

Principal indication for Cesarean section	Women who died following Cesarean section			
	Total	Result of pregnancy		
		Live birth	Stillbirth	Not reported
Total	537	393	141	3
Eclampsia	165	116	48	1
Preeclampsia	47	[1] 41	6	--
Uremia	27	21	6	--
Placenta previa	38	25	13	--
Premature separation of placenta	15	1	14	--
Ruptured uterus	9	1	8	--
Previous Cesarean	17	16	1	--
Contracted pelvis	28	26	2	--
Contracted pelvis and other indication	55	46	9	--
Abnormal presentation	33	21	12	--
Disproportion and long or difficult labor	61	48	12	1
Other indication	39	29	10	--
Not reported	3	2	--	1

[1] Includes a plural birth consisting of 1 live birth and 1 stillbirth.

ANESTHESIA

The anesthetic used in operations for the principal indications is shown in table 54. Type of anesthetic was reported for 480 cases. Ether was the most common anesthetic. It was used alone in 275 cases (57 percent) and in other cases with nitrous oxide, ethylene, chloroform, or local anesthesia. It was used alone in 90 (60 percent) of the 150 cases in which Cesarean sections were done on account of eclampsia and in which a report on the anesthetic used was obtained. Nitrous oxide oxygen anesthesia was used alone in 56 cases, with ether in 62 cases, and in a few cases with local anesthesia. Ethylene was used in 41 cases, in 1 of these with spinal anesthesia. Chloroform was used in 14 cases, 7 of which were eclamptic. Local anesthesia was used in only 19 cases, in 5 of which it was supplemented by nitrous oxide or ether and in 1 of which it was used with sacral anesthesia. Spinal anesthesia was used in 8 cases.

TABLE 54.—*Principal indication for Cesarean section and anesthetic used for women who died following Cesarean section*

Principal indication for Cesarean section	Women who died following Cesarean section											
	Total	Report on anesthetic										No report on anesthetic
		Total	Ether	Nitrous oxide	Nitrous oxide and ether	Ethylene[1]	Chloroform[2]	Local[3]	Local with nitrous oxide or ether	Spinal[4]	No anesthetic	
Total	537	480	275	56	62	40	14	14	5	8	6	57
Eclampsia	165	150	90	18	13	9	7	6	2	1	4	15
Preeclampsia	47	43	20	7	6	3	1	2	1	3	------	4
Uremia	27	22	12	1	2	2	1	2	1	------	1	5
Placenta previa	38	37	21	4	7	4	1	------	------	------	------	1
Premature separation of placenta	15	14	9	1	2	2	------	------	------	------	------	1
Ruptured uterus	9	8	3	------	2	2	------	1	------	------	------	1
Previous Cesarean	17	15	10	2	------	2	1	------	------	------	------	2
Contracted pelvis	28	23	13	1	8	1	------	------	------	------	------	5
Contracted pelvis and other indication	55	49	27	7	6	6	------	1	------	2	------	6
Abnormal presentation	33	29	19	2	3	3	1	------	1	------	------	4
Disproportion and long or difficult labor	61	57	36	8	8	4	1	------	------	------	------	4
Other indication	39	33	15	5	5	2	1	2	------	2	1	6
Not reported	3	------	------	------	------	------	------	------	------	------	------	3

[1] Includes 3 cases in which ethylene and ether were used.
[2] Includes 4 cases in which chloroform and ether were used.
[3] Includes 1 sacral anesthesia.
[4] Includes 1 spinal anesthesia with ethylene and 1 with local.

CESAREAN SECTION IN THE INDIVIDUAL STATES AND AMONG URBAN AND RURAL AND WHITE AND COLORED GROUPS

The percentages of the maternal deaths that were preceded by Cesarean section in the various States of the study ranged from 1 in North Dakota to 15 in California. For the deaths of mothers who had reached the last trimester of pregnancy the percentages preceded by Cesarean section ranged from 2 in North Dakota to 24 in California (table 55).

TABLE 55.—*Frequency of Cesarean section among all women who died from puerperal causes and among those who died after reaching the last trimester of pregnancy for whom there was a report on operation for delivery; each State included in the study*

State	Women dying from puerperal causes for whom there was a report on operation for delivery					
	All trimesters			Last trimester		
	Total	Cesarean section		Total	Cesarean section	
		Number	Percent		Number	Percent
Total	7, 211	537	7	4, 832	531	11
Alabama	1, 061	56	5	818	56	7
California	488	73	15	305	72	24
Kentucky	638	26	4	422	26	6
Maryland	378	44	12	252	43	17
Michigan	1, 284	97	8	783	95	12
Minnesota	479	19	4	328	19	6
Nebraska	322	31	10	193	31	16
New Hampshire	108	9	8	78	9	12
North Dakota	157	2	1	104	2	2
Oklahoma	284	15	5	179	15	8
Oregon	176	11	6	96	11	11
Rhode Island	161	9	6	109	9	8
Virginia	764	51	7	564	49	9
Washington	310	27	9	164	27	16
Wisconsin	601	67	11	437	67	15

Eleven percent in the urban and 5 percent in the rural districts were preceded by Cesarean section. For 8 percent of the white and 6 percent of the colored women death was preceded by this operation. The percentage of urban women whose deaths followed Cesarean section was the same for white as for colored (11), but among the rural women it was 5 percent for the white and 3 percent for the colored.

For those women who died following Cesarean section in the last trimester and for whom a report on operations was obtained, the incidence was 17 percent among the urban white, 16 percent among the urban colored, 7 percent among the rural white, and 4 percent among the rural colored.

COMMENT BY ADVISORY COMMITTEE [1]

INDICATIONS AND CHOICE OF OPERATION

The schedules for the women who died following Cesarean section were studied with the attendant circumstances of the cases in mind, such as parity, duration of labor, previous attempts at operative delivery, the condition of the patient at the time of operation, environment, and accessibility of the case. It is evident from the number of women who were reported to have died from sepsis and of those who probably died from sepsis, that poor selection of cases and unwise selection of the type of operation were frequent, as is shown by this case:

> Primipara, aged 19, eclamptic, had been in labor 72 hours. She had probably had vaginal examinations by midwife before admission to the hospital; the membranes had been ruptured an indefinite time. A classical Cesarean was performed. Death resulted in 3 days from streptococcic bloodstream infection.

The choice of Cesarean section in cases where the patient has lost a great deal of blood and is in poor condition is clearly contra-indicated, as this case shows:

> A woman in her fifth pregnancy, four babies having been delivered at term alive and with no complications. The husband came to engage a physician for confinement and stated that at that time his wife was having "a little" discharge of mucus and blood. Three days later the physician was called at 4 in the afternoon. The patient had had more than a little bleeding. A vaginal examination showed a marginal placenta previa. At 6 o'clock that same afternoon the patient had considerable bleeding, and she was packed by vagina and sent to the hospital, where she arrived at 1 a.m. The pads were saturated with blood. The packing was removed and replaced, and 12 hours later a classical Cesarean was done under ether anesthesia. The fetus was stillborn, and the mother died 45 minutes after the operation.

A transfusion before the operation was rare; but it is easy to see by study of the individual cases why it probably could not have been done. But in only a few cases was preparation made to do transfusion if it became necessary. This obviously should be done in all cases of placenta previa.

As would be expected, a considerable number of these operations were done with pelvic contraction given as the indication. The measurements often deviated but little from the normal and were not checked by an internal pelvic examination. Practically none of these women had an adequate test of labor.

---

[1] The obstetric advisory committee of the Children's Bureau has studied and accepted the comment of one of its members who reviewed all the schedules on Cesarean section.

A primipara, aged 18, had these external measurements of her pelvis: Anterior-posterior 19 cm, between spines 25 cm, between crests 27 cm, oblique 24 cm, between trochanters "52" (?). No internal examination had been made. The patient had been in labor 2 hours when a Cesarean section was done for which a contracted pelvis was the indication. The membranes had ruptured at the beginning of labor. The temperature of the woman upon admission to the hospital was 99; immediately following the operation it was 102. She died 6 days after the operation of "acute dilatation of the stomach."

The following is a case of an emergency Cesarean in which the previous history of the patient had not been taken well into consideration and she had not been given an adequate test of labor.

The woman was in her fourth pregnancy. Forceps had been used in 2 of the 3 previous deliveries, and there had been one stillbirth. In this pregnancy she was at about the eighth month when the membranes ruptured and 2 days later a Cesarean was done. The surgeon stated that the indications for Cesarean were obstructed labor, premature rupture of the membranes, history of previous obstructed labor with delivery of dead fetus. This patient had had only 6 hours of very occasional, weak pains. The external measurements were normal, and no internal examination of the pelvis had been made. A classical Cesarean was done, and the patient died of sepsis 7 days after the operation.

Difficult labor was often mentioned but was rarely discussed in relation to the dilatation and effacement of the cervix. Probably certain of these cases of "contracted pelvis and difficult labor" were actually cases of cervical dystocia, or were unrecognized occipitoposterior positions.

The indication "to save the baby" was given several times. That a mother with one or more small children at home should die from Cesarean section done for eclampsia "to save the baby" does not seem logical. The following case is an example:

A woman in her fifth pregnancy, aged 24, had four living children. The doctor stated that the patient was in a deep comatose state at the time of her operation, which was done "to save the baby." The mother died on the third day.

Undoubtedly this patient was in a very serious condition at the time of operation and possibly would have died anyway, but it has long been known that a Cesarean section done on such cases gives bad results. In the majority of such cases the baby is in a very poor condition, and the operation is not justifiable.

The number of cases of toxemia that were under observation for varying lengths of time in which an emergency Cesarean was finally done was noticeable. Early rupture of the membranes would probably have saved some of these lives. The following case comes in this group:

A woman in her second pregnancy, aged 38, had had a full-term pregnancy with a living baby. In the present pregnancy she developed a blood pressure of 160/110 in the twenty-fourth week. For this she was treated by diet and rest, and the symptoms cleared up. In the thirty-eighth week albuminuria and high blood pressure recurred, convulsions began, and 24 hours later a low cervical Cesarean was done under local anesthesia.

The number of severe cases of chronic nephritis in which Cesarean section was seemingly used as an operation of last resort was surprising. Chronic nephritis in multiparous women at or about term would probably be better treated by induction of labor. Comparatively few of the women upon whom the operation was done for chronic nephritis were sterilized at the time of operation.

A woman with 11 children live-born at term, two miscarriages, no operative deliveries. Symptoms were noted at the first examination in the twentieth week; blood pressure 265/140. She was put to bed. At the twenty-fourth week a Cesarean section was done under local anesthetic, with resection of tubes. Death occurred $10\frac{3}{4}$ hours after the operation.

Some few of these women had been given hospital treatment for preeclampsia. They improved and were allowed to go home, without adequate supervision in most cases. Later they developed convulsions, a Cesarean was done, and they died. There would seem to be need for wider dissemination of the knowledge that severe preeclampsia most often calls for an early induction of labor. Observation was made of the number of women with convulsions who were carried rather long distances to hospitals and operated upon immediately. It would scarcely have been believed that in a teaching hospital a classical Cesarean for eclampsia was done, with chloroform as an anesthetic and after an attempted accouchement forcé.

A para 2, aged 22, developed a blood pressure of 200 about term with edema, albuminuria, nausea, and vomiting. She had had prenatal care throughout the pregnancy. She was under treatment at home for 1 week. She died 3 days after a Cesarean section under ether anesthesia.

The number of classical Cesareans done for abnormal presentations after delivery from below had been attempted was astounding. The following is not an unusual story:

A para 2, aged 20, with a foot presentation, who had been in labor many hours and had had frequent attempts at delivery on the outside, was carried 25 miles to a hospital by automobile and had an immediate classical Cesarean. The baby was still-born. The mother's death from sepsis followed in 2 days.

Forty-five percent of all the women who had Cesareans had had more than one pregnancy. Fifty-six women had had six or more pregnancies. Careful study of the list of indications given for Cesarean section (p. 90) would seem to offer evidence of the lack of soundness of obstetric teaching. "Contracted pelvis", "difficult labor", "delayed labor" seemed to have been too frequent indications in multiparous women. The number of multiparous women with eclampsia upon whom a Cesarean section was done was unnecessarily large. There seems to be need for the adoption of a uniform, safe, and sane treatment for eclampsia, and an understanding that Cesarean section is not such a form of treatment as a rule.

Unwise selection of anesthesia was frequent. In the cases of Cesarean section for eclampsia ether was the most common anesthetic, and even chloroform was occasionally used (7 cases). Ether was also used in the presence of acute respiratory infection. Local anesthesia was used in surprisingly few cases (19).

IMMEDIATE CAUSE OF DEATH

The causes of death as given by the attending physicians and classified according to the international list are compared in table 56 with the probable immediate causes suggested by a member of the obstetric advisory committee of the bureau after careful study of each schedule without consideration of the international classification. Since puerperal sepsis takes precedence over all other puerperal causes in the international classification, the deaths due to sepsis would have been so classified if the fact of sepsis had been reported either on the death certificate or at the interview. Study of the schedules indicated that many deaths attributed by the attending physician to "acute dilatation of the heart" or to "acute ileus" were probably due to sepsis. Also, many of the deaths that were supposed to be due to acute nephritis were probably due to sepsis.

TABLE 56.—*Cause of death as shown by interview according to the international classification and immediate cause of death as shown by special study of the schedules among women who died following Cesarean section*

Cause of death as shown by interview according to international classification (1920)	Women who died following Cesarean section								
	Total	Immediate cause of death							
		Sepsis	Toxic conditions	Shock and/or hemorrhage	Embolism	Cardiac disease	Pneumonia	Other	Unknown
All causes	**537**	**251**	**158**	**72**	**18**	**11**	**12**	[1]**11**	**4**
Accidents of pregnancy	3	------	1	------	------	------	1	1	------
Puerperal hemorrhage	42	10	1	29	2	------	------	------	------
Other accidents of labor	146	66	8	31	14	8	7	8	4
Cesarean section	*136*	*66*	*8*	*22*	*14*	*8*	*6*	*8*	*4*
Others under this title	*10*	------	------	*9*	------	------	*1*	------	------
Puerperal septicemia	143	139	1	2	------	1	------	------	------
Puerperal phlegmasia alba dolens, embolus, sudden death	1	------	------	------	1	------	------	------	------
Puerperal albuminuria and convulsions	202	36	147	10	1	2	4	2	------

[1] Includes 5 women who died from intestinal obstruction, 1 from dilatation of stomach, 1 from chronic hepatitis, 1 from cerebral abscess with meningitis, 1 from cerebral hemorrhage, and 2 from anesthesia (1 spinal, 1 nitrous oxide and ether).

The probable immediate causes of death are shown in table 57 by principal indication for the Cesarean section and for primiparae and multiparae.

According to the physicians, 27 percent of the cases were classified as septic, but careful study of each record would seem to show that 47 percent were probably septic. This figure is conservative and is based upon the well-known signs and symptoms of sepsis and its common complications. The conditions under which the operations were done may account for this high percentage of sepsis. Eighty-five percent had not been contemplated and previously planned. The membranes were ruptured before the operation was done in 34 percent. One or more vaginal examinations had been done upon 52 percent. Sixty-two (12 percent) had had attempted delivery from below. The number of sections done for various types of dystocia after long and exhausting labors, and often after repeated attempts at delivery from below, shows lack of general recognition of the fact that the mortality from Cesarean section increases with the length of time the woman has been in labor and with attempts at delivery from below. In any discussion of sepsis following Cesarean it is to be remembered that the operating surgeon often does not have "first chance" with his patients. Yet this should be no reason for unwise selection of the operation to be performed. In many of these cases a Porro or low cervical operation should have been done instead of the classical Cesarean; in others no type of Cesarean operation should have been done.

Many of the surgeons could appropriately analyze the selection of their cases and study their operative technique and the surgical technique of their institutions, for many deaths resulted from sepsis in cases in which it apparently should not have occurred.

TABLE 57.—*Principal indication for Cesarean section and immediate cause of death as shown by special study of the schedules among primiparae and multiparae who died following Cesarean section*

Principal indication for operation, and parity	Women who died following Cesarean section								
	Total	Immediate cause of death							
		Sepsis	Toxic conditions	Shock and/or hemorrhage	Embolism	Cardiac disease	Pneumonia	Other	Unknown
Total	**537**	**251**	**158**	**72**	**18**	**11**	**12**	**[1] 11**	**4**
Eclampsia	165	36	126	1	------	------	2	------	------
Preeclampsia	47	22	7	11	3	1	2	1	------
Uremia	27	3	22	------	------	2	------	------	------
Placenta previa	38	19	1	15	2	------	1	------	------
Premature separation of placenta	15	6	------	8	------	------	1	------	------
Ruptured uterus	9	1	------	7	------	------	1	------	------
Previous Cesarean section	17	13	------	3	------	------	------	1	------
Contracted pelvis	28	20	1	4	1	------	------	1	1
Contracted pelvis and other indication	55	41	1	4	5	1	------	2	1
Abnormal presentation	33	23	------	5	2	------	2	------	1
Disproportion and long or difficult labor	61	44	------	8	4	2	1	2	------
Other indication	39	22	------	6	1	5	1	4	------
Not reported	3	1	------	------	------	------	1	------	1
Primiparae	*293*	*131*	*102*	*34*	*6*	*5*	*6*	*7*	*2*
Eclampsia	122	26	94	1	------	------	1	------	------
Preeclampsia	27	15	4	6	------	------	1	1	------
Uremia	3	------	2	------	------	1	------	------	------
Placenta previa	9	3	------	6	------	------	------	------	------
Premature separation of placenta	4	2	------	2	------	------	------	------	------
Ruptured uterus	1	------	------	1	------	------	------	------	------
Contracted pelvis	22	16	1	3	------	------	------	1	1
Contracted pelvis and other indication	30	20	1	4	3	------	------	1	1
Abnormal presentation	22	17	------	2	1	------	2	------	------
Disproportion and long or difficult labor	39	28	------	6	1	2	1	1	------
Other indication	14	4	------	3	1	2	1	3	------
Multiparae	*239*	*118*	*56*	*36*	*12*	*6*	*6*	*4*	*1*
Eclampsia	42	9	32	------	------	------	1	------	------
Preeclampsia	20	7	3	5	3	1	1	------	------
Uremia	24	3	20	------	------	1	------	------	------
Placenta previa	29	16	1	9	2	------	1	------	------
Premature separation of placenta	11	4	------	6	------	------	1	------	------
Ruptured uterus	6	1	------	4	------	------	1	------	------
Previous Cesarean section	17	13	------	3	------	------	------	1	------
Contracted pelvis	6	4	------	1	1	------	------	------	------
Contracted pelvis and other indication	25	21	------	------	2	1	------	1	------
Abnormal presentation	11	6	------	3	1	------	------	------	1
Disproportion and long or difficult labor	22	16	------	2	3	------	------	1	------
Other indication	24	17	------	3	------	3	------	1	------
Not reported	2	1	------	------	------	------	1	------	------
Parity not reported	*5*	*2*	------	*2*	------	------	------	------	*1*

[1] Includes 5 women who died from intestinal obstruction, 1 from dilatation of stomach, 1 from chronic hepatitis, 1 from cerebral abscess with meningitis, 1 from cerebral hemorrhage, and 2 from anesthesia (1 spinal, 1 nitrous oxide and ether).

In many of these cases the fundamental error was the failure of the patient to secure adequate prenatal care and the consequent lack of opportunity for the physician to plan properly for the delivery.

The tremendous mortality attending Cesarean section throughout the United States warrants a careful review of the indications for the choice of operation.

ABORTIONS

DEFINITION IN PRESENT STUDY DIFFERENT FROM INTERNATIONAL LIST

Abortion, as used in this report, may be defined as the termination of a previable uterine pregnancy. The term includes all terminations of uterine pregnancies before the seventh month (except a very few that resulted in live births), whether the termination was spontaneous or induced.[1] It includes, therefore, what is commonly known as "miscarriage."

Probably the most outstanding finding of this study is that one fourth of all the maternal deaths followed abortion. Almost three fourths of the deaths following abortion were due to puerperal septicemia, and these deaths from sepsis following abortion constituted nearly half of all the deaths from puerperal septicemia, the greatest single cause of maternal mortality.

This general term abortion is not the same as the title abortion or premature labor (no. 143a) in the International List of Causes of Death. This title in the international list, as it includes premature labor, does not necessarily denote previability. Also, many deaths following abortion are classified under some title other than the title abortion of the international list, as placenta previa (no. 144a), ruptured uterus (no. 145c), puerperal septicemia (no. 146), puerperal phlegmasia alba dolens, embolus, sudden death (no. 147), and puerperal albuminuria and convulsions (no. 148), as well as ectopic gestation (no. 143b), all take precedence over abortion (no. 143a).[2]

This section of the report deals with abortion as already defined, and all deaths following abortions in the study are, therefore, included in it. As abortion in this sense includes by definition only deaths of women who had not reached the last trimester, the group here discussed obviously excludes the 99 deaths of women who had reached the last trimester that were assigned under the international classification to abortion or premature labor (no. 143a).

CRIMINAL ABORTION

Deaths certified as due to criminal abortion are assigned to homicide in the International List of Causes of Death and therefore are not included in "maternal mortality." Self-induced abortions, however, are assigned to puerperal causes. The deaths certified as due to criminal abortion are not given separately by the Bureau of the Census; the small number so certified is manifestly incomplete, since undoubtedly many deaths actually due to criminal abortions are registered as due to other causes.

---

[1] Fourteen cases of attempted abortion in which the women died without actual expulsion of the fetus are also included.

[2] In the 1929 revision of the International List of Causes of Death, abortion with septic conditions (formerly part of puerperal septicemia) is no. 140, and abortion without mention of septic conditions is no. 141. (See appendix B, p. 212.) Except that septic abortion is no longer assigned to puerperal septicemia, the rules of precedence given above remain essentially the same.

As deaths following criminal abortions, if certified as such, are not included in maternal mortality, frankness on the part of physicians and zeal on the part of public authorities in investigating deaths thought to have resulted from criminal abortion and in correcting the certificates for the deaths would reduce the number of deaths assigned to puerperal causes in a city and so in a State.

As this study is based on the group of deaths certified as due to the puerperal causes, deaths certified as due to criminal abortion are not included. Attending physicians said on interview that they suspected or were convinced of the criminal induction of certain of the abortions that they had not certified as criminal. But it was impracticable to separate such criminal abortions from self-induced abortions, as there were many abortions about which the physicians who were called in at the last moment merely knew that they were artificially induced. Such abortions were therefore included in the study. Possibly some of the abortions reported by physicians as spontaneous were actually induced. But the physicians interviewed were assured that the information requested was for scientific purposes only, and the impression was obtained by the interviewers that most of them gave freely what information they had.

DEATHS FOLLOWING ABORTION AND THEIR CAUSES

Of the 2,381 deaths of women who had not reached the last trimester 1,825 followed abortion and 554 did not follow abortion; for 2 information on this point was not obtained. The 554 women whose deaths before they reached the last trimester did not follow abortion had had ectopic pregnancies or died without termination of pregnancy; a few (32) gave birth to living, and probably viable, children.

Of the 1,825 deaths following abortion 1,324 (73 percent) were attributed after interview, in accordance with the international list,

Table 58.—*Cause of death* [1] *as shown by interview for women who died following abortion, and trimester of pregnancy among women dying from puerperal causes who had not reached the last trimester of pregnancy*

Cause of death [1] as shown by interview	Women dying from puerperal causes who had not reached last trimester						
	Total	Following abortion				Not following abortion	Not reported whether following abortion
		Total	First trimester	Second trimester	First 2 trimesters, not otherwise specified		
All causes	2,381	1,825	991	470	364	554	2
Accidents of pregnancy	575	290	141	100	49	285	--------
Abortion, premature labor	*254*	*250*	*116*	*88*	*46*	*4*	--------
Ectopic gestation	*240*	--------	--------	--------	--------	*240*	--------
Other	*81*	*40*	*25*	*12*	*3*	*41*	--------
Puerperal hemorrhage (placenta previa)	11	4	--------	4	--------	7	--------
Other accidents of labor (Cesarean section)	1	--------	--------	--------	--------	1	--------
Puerperal septicemia	1,403	1,324	788	234	302	78	1
Puerperal phlegmasia alba dolens, embolus, sudden death	53	44	15	22	7	9	--------
Puerperal albuminuria and convulsions	338	163	47	110	6	174	1

[1] According to the Manual of the International List of Causes of Death, 1920.

to puerperal septicemia; 290 (16 percent) to accidents of pregnancy (250 to abortion or premature labor and 40 to others under this title); 163 (9 percent) to puerperal albuminuria and convulsions; 44 (2 percent) to puerperal phlegmasia alba dolens, embolus, sudden death; and 4 to puerperal hemorrhage (placenta previa) (table 58).[3] Deaths due primarily to hemorrhage following abortion are assigned to "abortion, premature labor."

TYPE OF ABORTION

The type of abortion was reported for 1,588 of the 1,825 cases. Of these, 794 (50 percent) were induced abortions other than therapeutic, 589 (37 percent) were spontaneous (that is, not brought about by mechanical means nor by drugs), and 205 (13 percent) were therapeutic (that is, done by any method for medical indications). Perhaps most of those of "type not reported" (237) were actually induced; they were almost certainly not therapeutic (table 59).

TABLE 59.—*Cause of death [1] as shown by interview among women who died following abortion of each specified type*

Cause of death [1] as shown by interview	Women who died following abortion of each specified type				
	Total	Spontaneous	Therapeutic	Induced	Type not reported
All causes	1,825	589	205	794	237
Abortion, premature labor	250	137	32	55	26
Other accidents of pregnancy	40	11	29		
Puerperal hemorrhage	4	1	2		1
Puerperal septicemia	1,324	354	44	722	204
Puerperal phlegmasia alba dolens, embolus, sudden death	44	25	4	13	2
Puerperal albuminuria and convulsions	163	61	94	4	4

[1] According to the Manual of the International List of Causes of Death, 1920.

Since these were all fatal abortions, it is obvious that the proportions of the types found cannot be considered representative of the proportions of types of nonfatal abortions any more than the incidence of abortions among these maternal deaths can be assumed to be an index of the total number of pregnancies ending in abortion. If abortions, or the conditions causing them, are either more or less dangerous than term deliveries, and if induced abortions are more likely to have fatal consequences than spontaneous abortions, the proportions of the types of abortions among these women who died do not present a true picture.

PREDOMINANCE OF SEPSIS AS A CAUSE OF DEATHS FOLLOWING ABORTION

As has been noted, puerperal septicemia was attributed as the cause of death of nearly three fourths of the 1,825 women who died following abortion, and the 1,324 deaths from septic abortion constituted 45 percent of all the deaths from puerperal septicemia (chart VII).

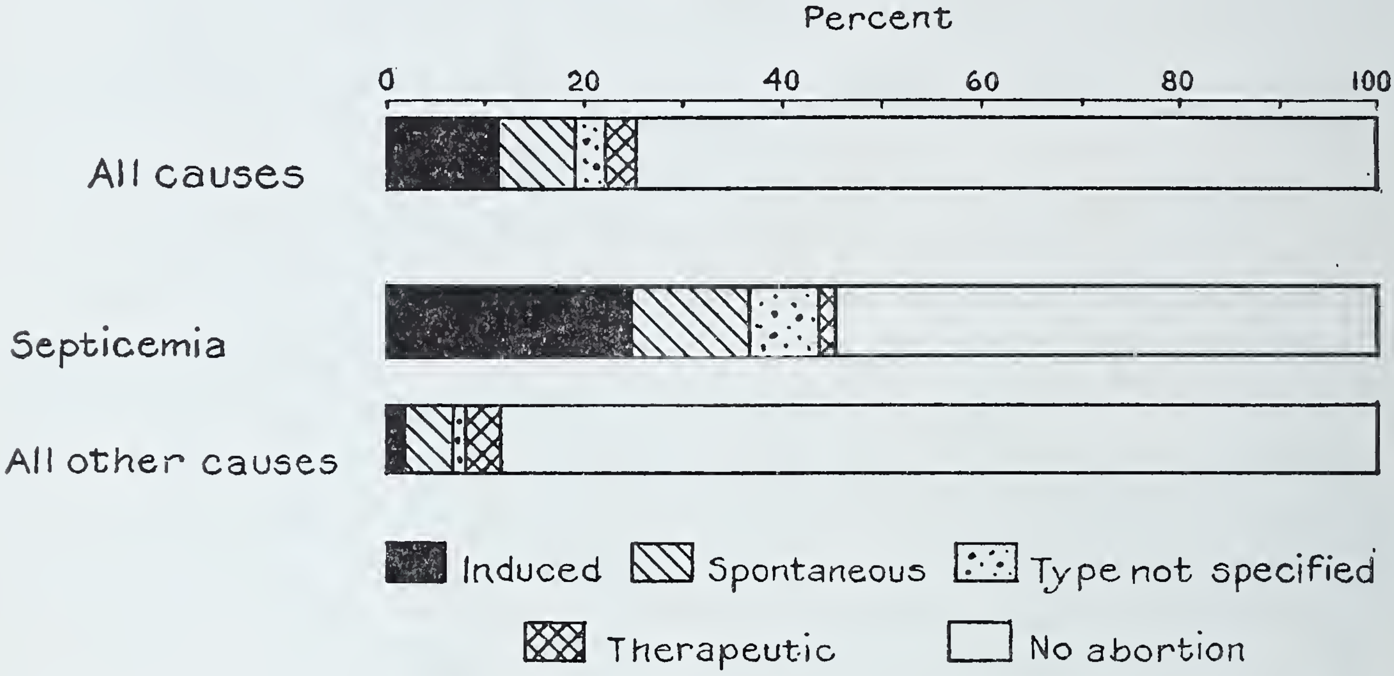
---

[3] According to the 1929 revision of the International List the 1,324 deaths would be attributed to abortion with septic conditions (no. 140), about 250 to abortion without mention of septic conditions (no. 141), and about 200 to other toxemias of pregnancy (no. 147); the classification of the others would remain the same. (See also appendix B, p. 212.)

The number and percentage of deaths from puerperal septicemia among women who died following the different types of abortion are shown in the following list:

Type of abortion	Total abortions	Septic abortion	
		Number	*Percent*
Total	1, 825	1, 324	73
Spontaneous	589	354	60
Therapeutic	205	44	21
Induced	794	722	91
Type not reported	237	204	86

CHART VII.—ABORTIONS AMONG WOMEN DYING FROM PUERPERAL CAUSES



Ninety-one percent of the deaths following induced abortion, 60 percent of those following spontaneous abortion, 21 percent of those following therapeutic abortion, and 86 percent of the deaths following abortion of unreported type were due to sepsis. Thus, though nearly all the deaths from induced abortion were due to sepsis, deaths following therapeutic abortion were due more often to the condition that gave the indication for the operation than to sepsis; and deaths following spontaneous abortion were due more often to sepsis than to hemorrhage or to a condition that may have brought about the abortion. The fact that 86 percent of the deaths following abortions of unreported type were due to sepsis suggests that most of these were actually induced abortions. However, sepsis sometimes supervenes in a patient weakened by another disease and the abortion resulting from it.

PERIOD OF GESTATION

The period of gestation was reported for 1,461 of the 1,825 women who died following abortion. In 548 cases it was less than 3 months; in 444 cases, 3 months; in 219 cases, 4 months; and in 250 cases, 5 or 6 months. More than half the women who had induced abortions and whose period of gestation was known had them in the first 2 months, while one fourth of the spontaneous and one eighth of the therapeutic abortions preceding death occurred during this period (table 60).

TABLE 60.—*Period of gestation among women who died following abortion of each specified type*

Period of gestation	Women who died following abortion of each specified type								
	Total		Spontaneous		Therapeutic		Induced		Type not reported
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	
Total	1,825	-------	589	-------	205	-------	794	-------	237
Period reported	**1,461**	**100**	**501**	**100**	**201**	**100**	**610**	**100**	**146**
Less than 3 months	548	38	127	25	24	12	336	55	61
3 months	443	30	150	30	60	30	185	30	48
4 months	220	15	100	20	47	23	50	8	23
5 months	119	8	58	12	28	14	25	4	8
6 months	131	9	66	13	42	21	14	2	9
Period not reported	**364**	-------	88	-------	**4**	-------	**184**	-------	88

OPERATIONS

A report concerning operations was obtained for 1,777 of the 1,825 women who died following abortions. Nine hundred and ninety-two (56 percent) had had operations, including 265 (45 percent) of the 583 women who had had spontaneous abortions and 403 (52 percent) of the 778 women who had had induced abortions. Of the 205 women who had had therapeutic abortions 38 (19 percent) had had other operations as well (table 61).

TABLE 61.—*Type of operation performed on women who died following abortion of each specified type*

Type of operation	Women who died following abortion of each specified type									
	Total		Spontaneous		Therapeutic		Induced		Type not reported	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	1,825	-----	589	-----	205	-----	794	-----	237	-----
Report on operation	**1,777**	**100**	**583**	**100**	**205**	**100**	**778**	**100**	**211**	**100**
Operation	*992*	*56*	*265*	*45*	*205*	*100*	*403*	*52*	*119*	*56*
Curettage:										
Alone	432	24	159	27	-----	-----	213	27	60	28
With blood transfusion	49	3	20	3	-----	-----	22	3	7	3
With laparotomy	46	3	17	3	-----	-----	23	3	6	3
With incision and drainage	25	1	4	1	-----	-----	18	2	3	1
With packing of uterus and cervix	23	1	10	2	-----	-----	11	1	2	1
With other operation	5	(1)	2	(1)	-----	-----	2	(1)	1	(1)
Therapeutic abortion:										
Alone	[2] 167	9	-----	-----	[2] 167	81	-----	-----	-----	-----
With subsequent curettage	[3] 9	1	-----	-----	[3] 9	4	-----	-----	-----	-----
With other operation	29	2	-----	-----	29	14	-----	-----	-----	-----
Hysterectomy only	7	(1)	2	(1)	-----	-----	5	1	-----	-----
Other laparotomy only	68	4	13	2	-----	-----	37	5	18	9
Blood transfusion only	42	2	10	2	-----	-----	23	3	9	4
Incision and drainage only	40	2	11	2	-----	-----	27	3	2	1
Packing of uterus and cervix only	25	1	11	2	-----	-----	10	1	4	2
Other operation	20	1	5	1	-----	-----	11	1	4	2
Type not reported	5	(1)	1	(1)	-----	-----	1	(1)	3	1
No operation	*785*	*44*	*318*	*55*	-----	-----	*375*	*48*	*92*	*44*
No report on operation	**48**	-----	**6**	-----	-----	-----	**16**	-----	**26**	-----

---

[1] Less than 1 percent.
[2] Includes 63 cases done by means of curettage, and 4 by means of hysterectomy.
[3] Includes 4 cases done by means of curettage.

The most frequent operation was curettage, which had been performed in 652 (37 percent) of the 1,777 cases. Of the women who had had spontaneous abortions 212 (36 percent) and of those who had had induced abortions 289 (37 percent) had been curetted.

Evidently many physicians did not consider fever a contra-indication for this operation, for *448 (69 percent) of the 652 women who had abortions and were curetted were reported to have had fever before the curettage* (table 62). Puerperal septicemia caused 94 percent of the deaths of these 448 women, as compared with 50 percent of the deaths of the women who were afebrile before the curettage and 68 percent of the deaths of the women who had had no curettage.

The 448 cases in which fever occurred before the curettage included 234 women with induced abortions other than therapeutic; 97 per cent of their deaths were due to sepsis. Some physicians, however, found out only after curettage, or after the death of the patient, that the abortion had been induced, and several stated on interview that they would not have curetted if they had had this information earlier.

Hemorrhage was reported present for 328 of the 652 cases in which there had been curettage, absent in 235 cases, and not reported on for 89 cases. Of the 1,086 women who died following abortions and who had not had curettage, 430 were reported as having had hemorrhage, 459 as having had no hemorrhage, and there was no report for 197. Whether or not the patient had had hemorrhage had very little effect on the proportions dying from sepsis after curettage in febrile cases (table 63).

The actual operations performed are discussed in the section Operations (p. 65).

INDICATIONS FOR THERAPEUTIC ABORTIONS

Pernicious vomiting was given as the principal indication for 112 of the 205 therapeutic abortions; other toxemias, usually of a convulsive type, for 52; hemorrhage, placenta previa, or premature separation, for 14; dead fetus, for 12; and other causes, for 15.

ILLEGITIMACY

Married women made up 90 percent of the women whose deaths followed abortions; but abortion was a more frequent cause of death among unmarried than among married mothers, as abortions preceded the deaths of about one fifth of the married mothers in the study and of more than one third of the 509 unmarried mothers. Live births were reported to the Bureau of the Census as legitimate or illegitimate in all the States of the study except California. For every 10,000 legitimate live births in the States of the study except California there were 14 deaths of married women following abortions. For every 10,000 illegitimate live births in these same States 50 deaths of unmarried women following abortions were reported.

Table 62.—*Relation between curettage and fever and deaths from puerperal septicemia and from all other puerperal causes among women who died following abortion of each specified type*

Curettage and fever	Women who died following abortion of each specified type																								
	Total abortions					Spontaneous abortions					Therapeutic abortions					Induced abortions					Type of abortion not reported				
	Total	Deaths from—				Total	Deaths from—				Total	Deaths from—				Total	Deaths from—				Total	Deaths from—			
		Puerperal septicemia		All other causes			Puerperal septicemia		All other causes			Puerperal septicemia		All other causes			Puerperal septicemia		All other causes			Puerperal septicemia		All other causes	
		Number	Percent	Number	Percent		Number	Percent [1]	Number	Percent [1]		Number	Percent [1]	Number	Percent [1]		Number	Percent [1]	Number	Percent [1]		Number	Percent [1]	Number	Percent [1]
Total	1,825	1,324	73	501	27	589	354	60	235	40	205	44	21	161	79	794	722	91	72	9	237	204	86	33	14
Curettage with—																									
Fever before	448	422	94	26	6	139	124	89	15	11	15	12	-----	3	-----	234	228	97	6	3	60	58	97	2	3
No fever before	204	103	50	101	50	73	34	47	39	53	57	12	21	45	79	55	42	76	13	24	19	15	-----	4	-----
No curettage	1,086	737	68	349	32	368	191	52	177	48	121	20	17	101	83	480	427	89	53	11	117	99	85	18	15
Curettage not reported	87	62	71	25	29	9	5	-----	4	-----	12	-----	-----	12	-----	25	25	-----	-----	-----	41	32	-----	9	-----

[1] Not shown where number of deaths was less than 50.

Table 63.—*Relation between curettage and fever and deaths from puerperal septicemia and from all other puerperal causes among women having hemorrhage and among women not having hemorrhage who died following abortion of each specified type*

Curettage and fever	Total abortions			Spontaneous abortions			Therapeutic abortions			Induced abortions			Type not reported		
	Total	Deaths from—		Total	Deaths from—		Total	Deaths from—		Total	Deaths from—		Total	Deaths from—	
		Puerperal septicemia	All other causes		Puerperal septicemia	All other causes		Puerperal septicemia	All other causes		Puerperal septicemia	All other causes		Puerperal septicemia	All other causes
	Women having hemorrhage who died following abortion of each specified type														
Total	773	579	194	319	209	110	29	9	20	330	282	48	95	79	16
Curettage with—															
Fever before	228	210	18	90	79	11	2	2	--------	105	100	5	31	29	2
No fever before	100	49	51	53	21	32	6	1	5	33	23	10	8	4	4
No curettage	430	307	123	173	107	66	21	6	15	188	155	33	48	39	9
Curettage not reported	15	13	2	3	2	1	--------	--------	--------	4	4	--------	8	7	1
	Women not having hemorrhage who died following abortion of each specified type														
Total	697	508	189	203	111	92	113	33	80	314	300	14	67	64	3
Curettage with—															
Fever before	169	161	8	39	35	4	13	10	3	98	97	1	19	19	--------
No fever before	66	30	36	14	8	6	39	11	28	10	8	2	3	3	--------
No curettage	459	315	144	150	68	82	60	12	48	205	194	11	44	41	3
Curettage not reported	3	2	1	--------	--------	--------	1	--------	1	1	1	--------	1	1	--------

AGE OF MOTHER AND TYPE OF ABORTION

The proportion of the maternal deaths that were preceded by abortions increased with the age of the mother up to the age of 30 and decreased thereafter. A larger proportion of the women who died following abortion (45 percent) than of all women dying from puerperal causes (40 percent) were from 25 to 34 years of age (table 64).

TABLE 64.—*Age at death of women who died following abortion of each specified type among women dying from puerperal causes*

Age period	Women dying from puerperal causes													
	Total		Following abortion of each specified type									Not following abortion		Not reported whether following abortion
			Total		Spontaneous		Therapeutic		Induced		Type not reported			
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution		Number	Percent distribution	
Total	7,380	-----	1,825	-----	589	-----	205	-----	794	-----	237	5,521	-----	34
Age period reported	**7,350**	**100**	**1,816**	**100**	**585**	**100**	**204**	**100**	**792**	**100**	**235**	**5,502**	**100**	**32**
Under 15 years	25	(1)	3	(1)	1	(1)	-----	-----	1	(1)	1	22	(1)	-----
15 years, under 20	855	12	179	10	43	7	17	8	92	12	27	673	12	3
20 years, under 25	1,545	21	392	22	110	19	54	26	174	22	54	1,146	21	7
25 years, under 30	1,537	21	435	24	126	22	43	21	204	26	62	1,094	20	8
30 years, under 35	1,412	19	388	21	140	24	41	20	161	20	46	1,019	19	5
35 years, under 40	1,312	18	295	16	99	17	31	15	130	16	35	1,012	18	5
40 years and over	664	9	124	7	66	11	18	9	30	4	10	536	10	4
Age period not reported	**30**	-----	**9**	-----	**4**	-----	**1**	-----	**2**	-----	**2**	**19**	-----	**2**

[1] Less than 1 percent.

More than half (52 percent) of the spontaneous abortions occurred at 30 years of age and over, as compared with 44 percent of the therapeutic abortions and 41 percent of the induced. The age at which the largest number of the induced abortions occurred was from 25 to 29 years (26 percent); of the therapeutic abortions, from 20 to 24 (26 percent); and of the spontaneous abortions, from 30 to 34 (24 percent). It is of interest that 12 percent of the women who had induced abortions were under 20 years of age, as compared with 8 percent of those who had therapeutic or spontaneous abortions. The age distribution of women whose deaths followed abortion but for whom the type of abortion was not reported was practically identical with that of women whose abortions were reported as induced.

PARITY AND TYPE OF ABORTION

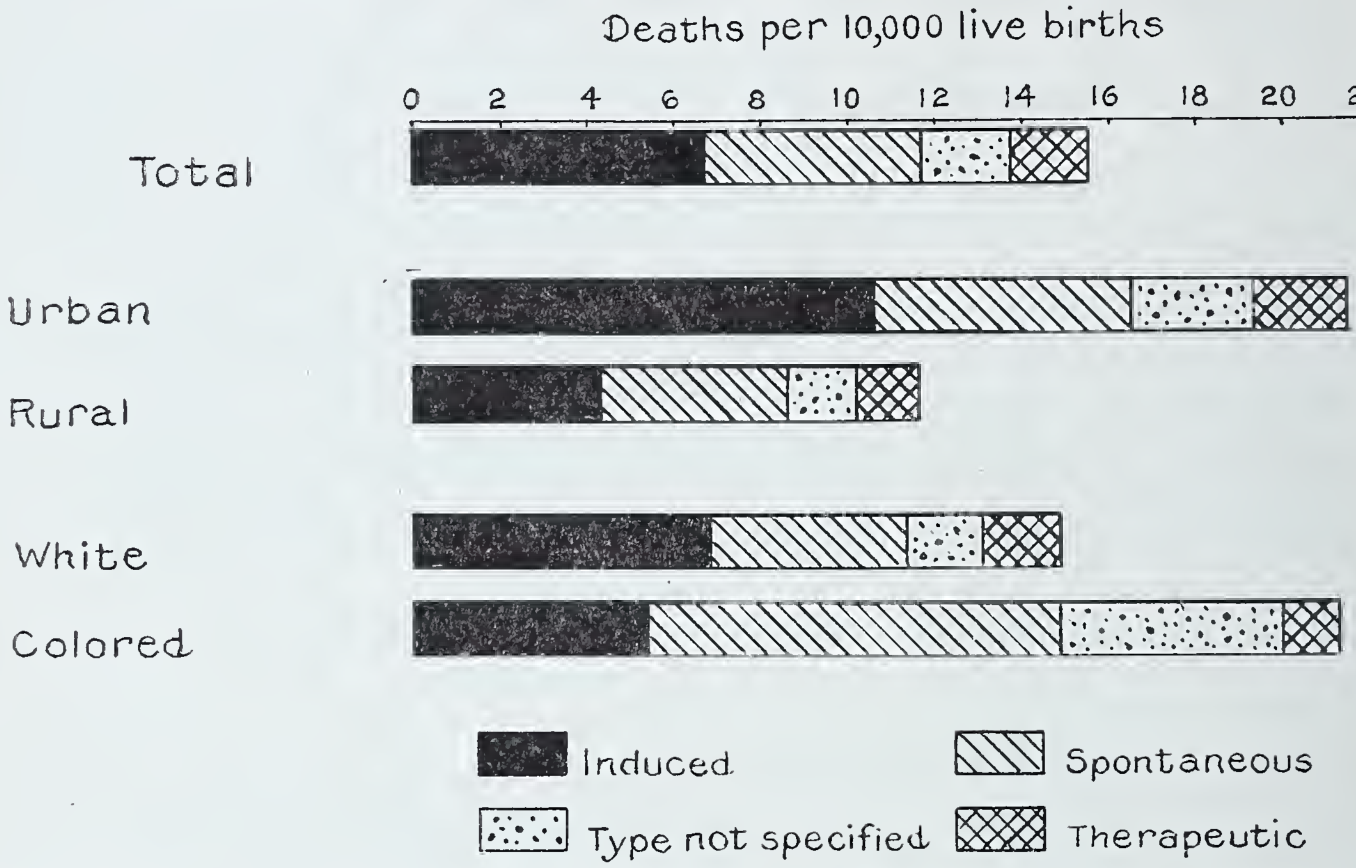
Abortions preceded the deaths of 18 percent of the known primiparae and 26 percent of the known multiparae in the study. Nearly half (49 percent) of the deaths of the 526 women of unknown parity were preceded by abortions. Among the primiparae for whom type of abortion was reported, 31 percent of the abortions were spontaneous, as compared with 40 percent among the multiparae. The deaths of known primiparae were preceded in 8 percent of the cases by induced abortions, in 5 percent by spontaneous abortions, and in 3 percent by therapeutic abortions; for 2 percent the type of abortion was not reported. Among known multiparae death was preceded by induced abortions in 11 percent of the cases, by spontaneous abortions in 9 percent, and by therapeutic abortions in 3 percent; for 3 percent the type was not reported.

MORTALITY FROM ABORTION AMONG WHITE AND COLORED AND URBAN AND RURAL GROUPS

The mortality rate for deaths following abortion was greater among colored than among white women, chiefly because of the larger incidence of deaths following spontaneous abortions among the colored (table 65).

The mortality rate for deaths following abortion was higher in the urban districts (22 per 10,000 live births) than in the rural districts (12), as were also the rates for deaths following each type of abortion.

CHART VIII.—MORTALITY RATES FOR DEATH FOLLOWING ABORTION AMONG WOMEN DYING FROM PUERPERAL CAUSES



The difference was most marked in induced abortions, for which the mortality rate was 11 per 10,000 live births in urban districts as compared with 4 in rural districts (table 65). This increases the difference between the total urban and the total rural maternal mortality rate.

TABLE 65.—*Type of abortion and mortality rate among white and colored women and women in urban and rural areas who died following abortion*

Type of abortion	Women who died following abortion									
	Total		White		Colored		In urban areas		In rural areas	
	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births
Total	1,825	15.5	1,568	14.8	257	21.3	993	21.5	832	11.6
Spontaneous	589	5.0	474	4.5	115	9.5	274	5.9	315	4.4
Therapeutic	205	1.7	189	1.8	16	1.3	103	2.2	102	1.4
Induced	794	6.7	729	6.9	65	5.4	488	10.6	306	4.3
Not reported	237	2.0	176	1.7	61	5.1	128	2.8	109	1.5

MORTALITY FROM ABORTION IN THE DIFFERENT STATES

The proportion of maternal deaths that followed abortion in the various States ranged from 18 percent in Alabama and Wisconsin to 34 percent in Oregon and 37 percent in Washington. The variation in the percentages of maternal deaths was greatest for induced abortions, which ranged from 3 percent of all the maternal deaths in Alabama to 23 percent in Washington. Three percent of all the maternal deaths were due to therapeutic abortion; the minimum (1 percent) was reported in Virginia and the maximum (7 percent), in New Hampshire. Deaths from spontaneous abortion varied from 6 percent in 5 States—California, Minnesota, New Hampshire, Oregon, and Virginia—to 11 percent in Oklahoma (table 66).

TABLE 66.—*Number and percentage of women whose deaths followed abortion of each specified type and whose deaths did not follow abortion among women dying from puerperal causes in each State included in the study*

State	Women dying from puerperal causes														
		Report on abortion													No report on abortion
			Total abortions		Spontaneous abortion		Therapeutic abortion		Induced abortion		Type of abortion not reported		No abortion		
	Total	Total	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Total	7,380	7,346	1,825	25	589	8	205	3	794	11	237	3	5,521	75	34
Alabama	1,118	1,102	194	18	107	10	17	2	33	3	37	3	908	82	16
California	493	493	134	27	32	6	15	3	70	14	17	4	359	73	------
Kentucky	645	639	167	26	63	10	18	3	60	9	26	4	472	74	6
Maryland	382	382	105	27	25	7	13	3	49	13	18	5	277	73	------
Michigan	1,312	1,309	389	30	108	8	33	3	203	16	45	3	920	70	3
Minnesota	491	488	112	23	31	6	26	5	45	9	10	2	376	77	3
Nebraska	329	329	97	29	28	9	9	3	52	16	8	2	232	71	------
New Hampshire	109	109	21	19	6	6	8	7	6	6	1	1	88	81	------
North Dakota	159	159	42	26	16	10	7	4	18	11	1	1	117	74	------
Oklahoma	300	297	93	31	33	11	9	3	37	12	14	5	204	69	3
Oregon	177	177	60	34	11	6	7	4	27	15	15	8	117	66	------
Rhode Island	165	165	38	23	11	7	6	4	19	12	2	1	127	77	------
Virginia	767	766	143	19	48	6	10	1	61	8	24	3	623	81	1
Washington	316	315	118	37	28	9	13	4	71	23	6	2	197	63	1
Wisconsin	617	616	112	18	42	7	14	2	43	7	13	2	504	82	1

For mortality rates following abortion in the different States see appendix table XVII, p. 208, and for the percentages of various types of abortion among white and colored women who died in urban and rural areas of the different States see appendix table XVIII, p. 209.

For septic abortion in the different States, see pp. 131–132.

COMMENT BY ADVISORY COMMITTEE

In reading the section on abortion it must be carefully kept in mind that the definition of "abortion" as used in this report is different from that of the international list. In this report the term "abortion" is used to mean the termination of a previable uterine pregnancy.

Undoubtedly among this number of deaths were some due to criminal abortions. If the abortions were known to be criminal and death followed, the deaths were assigned by the Bureau of the Census, according to the International List of Causes of Death, as homicides and were not included in the maternal mortality. It was impossible, however, to separate the known self-induced abortions from possible criminal abortions, and therefore they were included in the figures analyzed.

That one quarter of all the maternal deaths in this study followed some type of abortion is probably the most outstanding finding of the study. The further finding that three quarters of the deaths following abortion were due to puerperal septicemia is equally significant. As 1,825 deaths followed abortion out of the total of 7,380 deaths in this series, abortion is evidently one of the greatest problems in lowering the maternal mortality of the country.

The large proportion of induced abortions shows a very serious situation. Fifty percent of abortions of known type were induced and 13 percent of all the abortions were of "type not reported", so that many of these may have been induced. The seriousness of this situation is further shown by the fact that 73 percent of the deaths following abortion were due to puerperal septicemia. The high proportion of deaths from sepsis (91 percent) among deaths following induced abortion was perhaps to be expected. It is difficult to understand, however, the number of deaths from sepsis among those having spontaneous and therapeutic abortions, and one cannot help wondering if many of the so-called spontaneous abortions were not really induced. As was to be expected in those women who had induced abortions, more than half were done in the first 2 months of pregnancy. A surprising number of therapeutic abortions were done in the second trimester of pregnancy.

The most frequent operation in the management of these abortions was curettage (usually with sharp instruments, which is a procedure definitely to be condemned). It is clear that many physicians did not consider fever a contra-indication for curettage; yet in those cases in which it was known that fever existed and curettage was done, 94 percent of the deaths were due to sepsis. In marked contrast is the fact that only 50 percent of the deaths of the women who were afebrile at time of operation were due to sepsis. In not a few cases the history of an induced abortion was not discovered until after the patient had been curetted or even after she had died. Evidently a careful history in many of these cases was not obtained.

Hemorrhage was of frequent occurrence in these abortion cases, but the fact that the patient had had a hemorrhage had very little effect on the proportion of deaths from sepsis after curettage in febrile cases.

As pernicious vomiting was the principal indication given for 112 of the therapeutic abortions, it would seem that the physicians had delayed in doing the abortion or had been called in consultation too late to save the patient's life, or else had improper technique.

Analysis of the figures on illegitimacy brings up the whole problem of abortion in unmarried mothers, for abortions accounted for more than one third of the deaths of unmarried mothers in this series.

This study shows very clearly the seriousness of the problem created by the great number of abortions that are induced each year. It also shows that the practice of curetting every patient who has an abortion is common. Physicians must be made to appreciate the seriousness of curetting these potentially septic cases. The management of an abortion calls for the best medical care that can be given, and in many of the cases in this series it is obvious that such care was not given. The abortion problem is a widespread sociological and economic problem, which the medical profession must have help in solving. However, the physician has one great obligation—to teach the public the dangers entailed by abortion, whether spontaneous or induced.

PUERPERAL SEPTICEMIA [1]

Puerperal septicemia is the most important cause of death connected with pregnancy or childbirth, being responsible for 40 percent of all the maternal deaths included in the study, for 59 percent of the deaths of women who had not reached the last trimester, and for 31 percent of the deaths of women who had reached the last trimester. It differs from the other chief causes of maternal death—toxemia, hemorrhage, obstructed delivery—in that it is not in itself an abnormality of the ordinary process of pregnancy and labor or the puerperium. It is, on the contrary, an invader whose entrance is facilitated by, although not dependent upon, the lowered defenses incident to the struggle with pathologic processes of pregnancy and labor and the puerperium. Women who have been weakened by hemorrhage, by eclampsia, or by the exhaustion of a long and difficult labor are an easy prey to infection; and infection is the chief cause of death of women for whom an operative delivery is necessary and who survive the shock of the operation itself. It is also the chief cause of death following abortion from any cause. Thus, abortions preceded 1,324 (45 percent) of the deaths due to puerperal septicemia, and abortions reported to have been induced (other than therapeutic) preceded 722 deaths (24 percent). Ectopic pregnancy was a factor in 65 deaths from sepsis.[2] Placenta previa was present in 53 cases and 84 women had other puerperal hemorrhage of such severity that it was considered the principal contributory cause of death. One hundred and sixty-nine women who died from sepsis after delivery were reported to have had postpartum hemorrhage as a contributing factor. Eclampsia or severe toxemia of pregnancy was a principal contributory cause of death in 168 cases. Operations aimed at delivery were performed on 573 women who died of sepsis after reaching the last trimester. Of these operations 140 (25 percent) were Cesarean sections.

For this reason deaths from puerperal septicemia have been discussed in the sections on abortions, Cesarean section, and other operations, and will be mentioned in the sections on toxemia, hemorrhage, and ectopic gestation.

DEATHS ATTRIBUTED TO SEPTICEMIA IN THE GROUP STUDIED

From the death certificates and subsequent queries of indefinite certificates, 2,827 of the 7,537 deaths studied were assigned by the Bureau of the Census to puerperal septicemia. On interview with the attendant 110 of these were found to have been actually due to other causes; 64 of these 110 were not strictly puerperal and were therefore omitted from the study. (See General Considerations, table 2, p. 10.) Some of these deaths were of women who had not been seen by a physician before death but were certified as due to puerperal septicemia, or "childbed fever", by local registrars, coroners, or physicians signing the death certificate. Clerical errors in transcribing certificates or by the physicians themselves in answering queries led to a few mistakes in certification; and in some instances in which an abortion was merely a terminal event in a fatal sepsis with some other origin this fact was not made clear on the original certificate and so the death was wrongly assigned to puerperal septicemia. The interviews also disclosed, however, that 231 deaths assigned to other puerperal causes were really due to puerperal septicemia, and these deaths were so classified in the study. These changes involve only the cases in which the sepsis, although not mentioned on the death certificate, was diagnosed by the attending physician, or in which the history of septic temperature, positive blood culture, or autopsy findings made the change in diagnosis inevitable. This gives a total of 2,948 deaths considered due to puerperal sepsis.

---

[1] There is no discussion of bacteriologic findings as data concerning them were meager. Very few blood cultures were made or other bacteriologic studies done.

[2] Abortion with septic conditions and ectopic gestation with septic conditions are separate titles in the 1929 revision of the International List of Causes of Death. (See appendix B, p. 212.)

Certain other deaths were probably due to sepsis. For instance, in a study of the schedules of the 537 deaths following Cesarean section a member of the committee decided that the history of the cases indicated sepsis in 251 cases, although only 143 had been attributed to sepsis by the physicians on interview and still fewer, 113, were so assigned according to the death certificates. (See Cesarean Section, table 56, p. 101.) Only the 143 are included in the 2,948 attributed to sepsis in this section.

The term puerperal septicemia, therefore, as used in this section, means obvious and unmistakable sepsis, and the number of deaths here attributed to the cause is the minimum.

DURATION OF PREGNANCY

Of the 2,948 women who died from puerperal septicemia 838 did not reach the second trimester, 251 reached the second but not the last trimester, and 314 did not reach the last trimester (whether they reached the second was not known); 1,529 reached the last trimester; and for 16 the trimester of pregnancy was not known. Of the 1,403 women who died from sepsis before the last trimester, 1,324 died following abortion (the termination of a previable uterine pregnancy) 62 died following ectopic gestation, and 10 died after giving birth to living children; in the remaining 7 cases either the women died undelivered or the outcome was unknown.

A report as to type was obtained for 1,120 of the 1,324 abortions preceding death from puerperal septicemia. Of these 1,120 abortions, 722 (64 percent) were induced (other than therapeutic), 354 (32 percent) were said to have been spontaneous, and 44 (4 percent) were therapeutic. (See p. 131 and tables 77 and 78. Deaths following abortion are also discussed under that heading, p. 105.)

INTRAUTERINE MANIPULATION

The first question that comes to mind in the analysis of a series of septic deaths is whether or not there had been any intrauterine manipulation, such as induction of abortion, operative delivery, or curettage. Information on this point was obtained in 2,549 of the 2,948 cases of death from sepsis, and there had been some manipulation in

1,546 (61 percent) of these cases. The time of this manipulation was reported for 1,526 of the 1,546 cases. In 748 cases (49 percent) the manipulation had been only before the onset of sepsis; in 517 cases (34 percent), after the onset; and in 261 cases (17 percent), both before and after.

In sepsis cases of women who had not reached the last trimester of pregnancy the intrauterine manipulation before the onset of sepsis was usually the induction of an abortion; after the onset of sepsis it was usually curettage. (See p. 108.) For women who had reached the last trimester intrauterine manipulation before the onset of sepsis was usually an operative delivery; after the onset of sepsis it was usually curettage, although curettage was less frequent on these women than on those dying from sepsis who had not reached the last trimester.

OPERATIONS

FIRST TWO TRIMESTERS

Operations for delivery

Of 1,395 women who died from sepsis before reaching the third trimester and for whom there was a report on operation for the delivery of the fetus, there had been a laparotomy for ectopic gestation in 52 cases, a therapeutic abortion in 44 cases, and some other operation in 6 cases. The six were not called therapeutic abortions because they either resulted in live births or were performed at the end of the second trimester. The remaining 1,293 women had no operation for delivery, except that some may have had criminal abortions, none of which were listed as operations in this study.

Operations not for delivery

There was a report on operation other than for the delivery of the fetus in 1,363 of the 1,403 cases of sepsis before the last trimester was reached; 743 women had such an operation and 620 did not. The following list shows the types of operations performed on these 743 women:

Operations other than for delivery	743
Curettage:	
Only	376
With blood transfusions	45
With blood transfusions and packing of uterus or cervix	2
With blood transfusions and incision and drainage	1
With blood transfusions and laparotomy for drainage	3
With other laparotomies	41
With incision and drainage for infection	25
With packing of uterus or cervix	20
With laparotomy (appendectomy and salpingectomy) and perineorrhaphy	1
With trachelorrhaphy and perineorrhaphy	1
Blood transfusions (not with curettage):	
Only	50
With incision and drainage for infection	7
With laparotomies other than hysterectomies	7
Hysterectomies:	
Only	9
With other operation	2
Other laparotomies:	
Only	78
With incision and drainage for infection	1

Incision and drainage for infection:	
Only	45
With other operation (exclusive of those with blood transfusion also)	2
Packing of uterus or cervix:	
Only	15
With repair of lacerated uterus	1
Other operation	7
Type not reported	4

Many of the "other laparotomies" were done for drainage of peritonitis; others were salpingectomies or enterostomies. The incisions for infection other than laparotomies were incisions of abscesses or posterior colpotomies.

LAST TRIMESTER

Operations for delivery

Of the 1,474 women who died of sepsis after reaching the last trimester for whom there was a report on operation for delivery 573 (39 percent) had such an operation (table 67). The relationship of operations aimed at delivery to the deaths from sepsis is different from their relationship to the deaths from the other causes. In the cases of placenta previa or eclampsia, for instance, the operation was done on account of those conditions; but in cases of death from sepsis, the sepsis did not usually appear until after the operation—the operation being perhaps the result of placenta previa but the cause of sepsis. For this reason the tables do not show whether operative or nonoperative cases are more likely to result in death from sepsis—even though there were fewer operations for delivery among the women who died from sepsis (39 percent) than among the women who died from such other causes as puerperal hemorrhage (64 percent) and albuminuria and convulsions (46 percent). Most of the women who died of hemorrhage or convulsions following operative delivery had not had time to develop sepsis.

Women who died of sepsis following operative deliveries developed sepsis earlier than those who died of sepsis following spontaneous deliveries. This is discussed more fully on page 121.

Operations not for delivery

Operations in the last trimester other than for delivery, however, were far more numerous among women who died of sepsis than among those who died of other causes. Although these operations were usually performed on account of the sepsis, they may at times have actually brought about the fatal termination of the disease. There were, for instance, 100 women who had curettage among the 1,483 who died of sepsis after reaching the last trimester and on whom there was a report as to type of operation other than for delivery (table 68).

TABLE 67.—*Principal operation for delivery performed on women dying from puerperal septicemia and on all women dying from puerperal causes who had reached the last trimester of pregnancy*

Type of principal operation for delivery	Women who had reached last trimester—			
	Dying from all puerperal causes		Dying from puerperal septicemia	
	Number	Percent distribution	Number	Percent distribution
Total	4, 965		1, 529	
Report on operation	**4, 832**	**100**	**1, 474**	**100**
Operation	*2, 225*	*46*	*573*	*39*
Cesarean section	469	10	112	8
Cesarean section following other operation	62	1	28	2
Forceps:				
Alone	518	11	165	11
With dilatation of cervix	150	3	13	1
With version	64	1	24	2
With manual removal of placenta	24	(1)	6	(1)
With other operation	60	1	9	1
Dilatation of cervix and version	224	5	25	2
Version	218	5	64	4
Dilatation of cervix	108	2	21	1
Manual removal of placenta	87	2	40	3
Craniotomy or embryotomy following other operation	57	1	27	2
Dilatation of cervix, version, and manual removal of placenta	48	1	7	(1)
Breech extraction	42	1	10	1
Other operation	85	2	18	1
Type not reported	9	(1)	4	(1)
No operation	*2, 607*	*54*	*901*	*61*
No report on operation	**133**		**55**	

[1] Less than 1 percent.

TABLE 68.—*Principal operation other than for delivery performed on women dying from puerperal septicemia and on all women dying from puerperal causes who had reached the last trimester of pregnancy*

Type of principal operation other than for delivery	Women who had reached last trimester—			
	Dying from all puerperal causes		Dying from puerperal septicemia	
	Number	Percent distribution	Number	Percent distribution
Total	4, 965		1, 529	
Report on operation	**4, 839**	**100**	**1, 485**	**100**
Operation	*636*	*13*	*393*	*26*
Curettage:				
Alone	84	2	77	5
With blood transfusion	14	(1)	13	1
With incision and drainage and blood transfusion	2	(1)	2	(1)
With other operation	9	(1)	8	1
Blood transfusion only	149	3	95	6
Blood transfusion and packing of uterus or cervix	13	(1)	7	(1)
Packing of uterus or cervix	121	3	16	1
Hysterectomy only or with other operation	34	1	13	1
Other laparotomies	110	2	83	6
Incision and drainage for infection	45	1	41	3
Incision and drainage for infection and other operation	18	(1)	18	1
Other operation	35	1	18	1
Type not reported	2	(1)	2	(1)
No operation	*4, 203*	*87*	*1, 092*	*74*
No report on operation	**126**		**44**	

[1] Less than 1 percent.

The blood transfusions which were done in these cases sometimes were for the sepsis itself but more often were done on account of hemorrhage. Blood transfusion was known to have been performed on 64 women who later died of sepsis and who did not have hemorrhage.

INTERVAL BETWEEN DELIVERY AND APPEARANCE OF SYMPTOMS

Puerperal septicemia after the last trimester of pregnancy was reached—or roughly after delivery rather than after abortion or ectopic gestation—caused the deaths of 1,529 women. Onset of labor was spontaneous for most of these women—1,386 (94 percent) of the women for whom a report as to onset was obtained. Termination of labor was spontaneous in 65 percent of the cases in which information as to termination was obtained; it was artificial in 34 percent.

Symptoms of sepsis developed more quickly among the women who had had operative deliveries than among those who delivered spontaneously. More of the women with operative deliveries showed symptoms of sepsis before delivery (19 percent) than women with spontaneous deliveries (12 percent), and nearly twice as large a proportion (37 percent with operative deliveries as compared with 19 percent with spontaneous) developed sepsis within the first 2 days after delivery (table 69).

TABLE 69.—*Time between delivery and appearance of symptoms and type of termination of labor among women dying from puerperal septicemia who had reached the last trimester of pregnancy*

Time between delivery and appearance of symptoms	Women dying from puerperal septicemia who had reached last trimester							
	Total		Having spontaneous termination		Having artificial termination		Having no termination[1]	No report on termination
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution		
Total	1, 529	--------	958	--------	507	--------	11	53
Time reported	**1, 303**	**100**	**802**	**100**	**474**	**100**	**11**	**16**
Before delivery	196	15	93	12	92	19	11	--------
Less than 2 days after delivery	328	25	150	19	176	37	--------	2
2 days, less than 1 week	602	46	422	53	173	36	--------	7
1 week or more	177	14	137	17	33	7	--------	7
Time not reported	**226**	--------	**156**	--------	**33**	--------	--------	**37**

[1] Percent distribution not shown because number of women was less than 50.

Similarly, among the women concerning whom the time of onset of symptoms was reported, 14 percent of the 1,206 women for whom labor began spontaneously and 30 percent of the 74 women who had operative or medical induction of labor developed sepsis before the actual delivery. Twenty-five percent of the former and 32 percent of the latter developed sepsis within 2 days after delivery, but this difference is not statistically significant on account of the smallness of the group.

The time between delivery and the appearance of the first symptoms of sepsis was reported in 1,303 of the 1,529 cases of women who died from sepsis after reaching the last trimester of pregnancy. Symptoms of sepsis, such as fever, sometimes with chills or purulent vaginal discharge, appeared before the actual delivery in 196 cases (15 percent); within 2 days after delivery in 328 cases (25 percent); between 2 days and a week after delivery in 602 cases (46 percent); and a week or more after delivery in 177 cases (14 percent).

The 196 cases in which symptoms of sepsis appeared before the actual delivery were studied for the presumable cause of the sepsis. Long labor, early rupture of membranes, or attempts at delivery, alone or in combination, were apparently responsible in 53 cases, and one or more of these and some other factor in 7 cases. An infectious disease (usually respiratory) at the time of labor was the probable source of the sepsis in 38 cases. Macerated fetus was associated with sepsis in 18 cases, pyelitis in 15, gonorrhea or pelvic inflammatory disease in 11, and some other possible cause in 22. In 32 cases no probable reason for the development of sepsis was given.

In general, symptoms of sepsis appeared earlier in relation to delivery in women who had longer labors, as is shown in table 70.

TABLE 70.—*Time between delivery and appearance of symptoms and hours in labor among women dying from puerperal septicemia who had reached the last trimester of pregnancy*

Time between delivery and appearance of symptoms	Women dying from puerperal septicemia who had reached last trimester														
	Total		Hours in labor												
				Less than 6		6, less than 12		12, less than 24		24, less than 36		36 or more			
	Number	Percent distribution	None[1]	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Not reported
Total	1,529	-----	34	393	-----	296	-----	210	-----	76	-----	160	-----	360
Time reported	**1,303**	**100**	**31**	**363**	**100**	**275**	**100**	**194**	**100**	**68**	**100**	**151**	**100**	**221**
Before delivery	196	15	10	59	16	26	9	21	11	15	22	40	26	25
Less than 2 days after delivery	328	25	11	76	21	60	22	61	31	27	40	65	43	28
2 days, less than 1 week	602	46	8	168	46	149	54	87	45	21	31	42	28	127
1 week or more	177	14	2	60	17	40	15	25	13	5	7	4	3	41
Time not reported	**226**	-----	**3**	**30**	-----	**21**	-----	**16**	-----	**8**	-----	**9**	-----	**139**

[1] Percent distribution not shown because number of women was less than 50.

ATTENDANT AT BIRTH

The questions of the attendant at birth, the technique of delivery, and the nursing and aftercare of the patient are of particular interest in these cases of death from sepsis.

Sepsis was the cause of a larger proportion of the deaths of women who had been attended at delivery by midwives than of women who had been attended by physicians. Of the 550 women who died after reaching the last trimester who had been attended by a midwife, or a midwife and a physician, or a midwife and an interne, 239 (43 percent) died of sepsis. Of the 4,065 women who died after being attended at delivery by physicians, internes, or medical students (exclusive of those attended by physicians and internes following midwives or other attendants) 1,177 (29 percent) died of sepsis.

However, all but 24 of the women who died of sepsis after reaching the last trimester eventually had the care of a physician before death, no matter by whom they were delivered. Four hundred and ninety of them received hospital care throughout their illness. Of the women delivered outside hospitals the physician made his first postpartum call 1 day or less after delivery in 544 cases, 2 days after delivery in 66 cases, 3 or 4 days after delivery in 71 cases, and 5 days or more after delivery in 121 cases. In 213 cases the time of the physician's first call was not reported.

NURSING CARE

Information on nursing care at home was obtained in the cases of 778 women who died from sepsis after reaching the last trimester and who were outside hospitals at least part of the time during their illness. Only 32 of these women had the regular care of a trained nurse; 17 more had the care of a visiting nurse. A practical nurse did the nursing of 82 women, and a midwife of 62 women. Members of the family or other untrained persons nursed 402 women who died of sepsis, and 183 women were said to have had no nursing care, although very casual and unskilled care was probably what was meant in most cases. Some of all these groups were later taken to hospitals.

TECHNIQUE OF PRINCIPAL PHYSICIAN

ASEPSIS

The delivery technique of the physician in charge was reported in 1,114 cases of women who died of sepsis after pregnancies lasting into the third trimester. The technique was said to be aseptic in 445 cases (40 percent) (usually hospital cases); attempt was made at asepsis but under conditions making its attainment unlikely, in 158 cases (14 percent); a technique in which there was ordinary cleanliness was used in 405 cases (36 percent); in 106 cases (10 percent) even ordinary cleanliness was lacking. Moreover, the physician finally in charge was preceded in 179 cases by a midwife or by some other unskilled attendant or by another physician with less careful technique (table 71).

It is of some interest to compare these figures with those for women dying of puerperal causes other than sepsis after reaching the third trimester. Of these there was a report on technique in 2,505 cases, with 1,295 cases (52 percent) aseptic, 352 (14 percent) attempted aseptic, 694 (28 percent) clean but not sterile, and 164 cases (7 percent) dirty.

TABLE 71.—*Attendant at confinement and technique of principal physician*[1] *among white and colored women dying from puerperal septicemia who had reached the last trimester of pregnancy*

TOTAL

Attendant at confinement	Women dying from puerperal septicemia who had reached last trimester											
	Total	Technique of principal physician reported									Technique of physician not reported	No physician or attendant not reported
		Total	Aseptic		Attempted aseptic		Clean, not sterile		Dirty			
			Number	Percent[2]	Number	Percent[2]	Number	Percent[2]	Number	Percent[2]		
Total	**1,529**	**1,114**	**445**	**40**	**158**	**14**	**405**	**36**	**106**	**10**	**154**	**261**
Physician	*1,177*	*1,036*	*427*	*41*	*148*	*14*	*366*	*35*	*95*	*9*	*141*	-----
Only[3]	1,128	990	384	39	147	15	365	37	94	9	138	-----
Preceded by interne or student[4]	25	24	22	----	1	----	1	----	----	----	1	-----
Interne or student only	24	22	21	----	----	----	----	----	1	----	2	-----
Midwife	*239*	*65*	*15*	*23*	*7*	*11*	*35*	*54*	*8*	*12*	*11*	*163*
Only	163	-----	-----	----	-----	----	-----	----	-----	----	-----	163
Followed by physician	75	64	14	22	7	11	35	55	8	13	11	-----
Followed by interne or student	1	1	1	----	-----	----	-----	----	-----	----	-----	-----
Other attendant	*62*	*13*	*3*	----	*3*	----	*4*	----	*3*	----	*2*	*47*
Only	47	-----	-----	----	-----	----	-----	----	-----	----	-----	47
Followed by physician	15	13	3	----	3	----	4	----	3	----	2	-----
None	*28*	-----	-----	----	-----	----	-----	----	-----	----	-----	*28*
Not reported	*23*	-----	-----	----	-----	----	-----	----	-----	----	-----	*23*
WHITE												
Total	**1,218**	**942**	**381**	**40**	**145**	**15**	**335**	**36**	**81**	**9**	**135**	**141**
Physician	*1,036*	*908*	*373*	*41*	*139*	*15*	*319*	*35*	*77*	*8*	*128*	-----
Only[3]	999	872	340	39	138	16	318	36	76	9	127	-----
Preceded by interne or student[4]	19	19	17	----	1	----	1	----	----	----	-----	-----
Interne or student only	18	17	16	----	-----	----	-----	----	1	----	1	-----
Midwife	*100*	*24*	*6*	----	*3*	----	*13*	----	*2*	----	*5*	*71*
Only	71	-----	-----	----	-----	----	-----	----	-----	----	-----	71
Followed by physician	28	23	5	----	3	----	13	----	2	----	5	-----
Followed by interne or student	1	1	1	----	-----	----	-----	----	-----	----	-----	-----
Other attendant	*49*	*10*	*2*	----	*3*	----	*3*	----	*2*	----	*2*	*37*
Only	37	-----	-----	----	-----	----	-----	----	-----	----	-----	37
Followed by physician	12	10	2	----	3	----	3	----	2	----	2	-----
None	*18*	-----	-----	----	-----	----	-----	----	-----	----	-----	*18*
Not reported	*15*	-----	-----	----	-----	----	-----	----	-----	----	-----	*15*

---

[1] Includes interne or student. When there was more than 1 physician the one who did the actual delivery or who was finally in charge if the woman died undelivered was called the principal physician.

[2] Percent not shown where number of women was less than 50.

[3] Includes 76 cases (59 white and 17 colored) classed as aseptic, 4 cases (all white) classed as attempted aseptic, and 5 cases (3 white and 2 colored) classed as clean, not sterile, in which the physician had been preceded by another physician with less careful technique.

[4] Includes 3 cases (1 white and 2 colored) classed as aseptic in which the physician had been preceded also by another physician with less careful technique.

TABLE 71.—*Attendant at confinement and technique of principal physician among white and colored women dying from puerperal septicemia who had reached the last trimester of pregnancy*—Continued

COLORED

Attendant at confinement	Women dying from puerperal septicemia who had reached last trimester											
	Total	Technique of principal physician reported									Technique of physician not reported	No physician or attendant not reported
		Total	Aseptic		Attempted aseptic		Clean, not sterile		Dirty			
			Number	Percent	Number	Percent	Number	Percent	Number	Percent		
Total	**311**	**172**	**64**	**37**	**13**	**8**	**70**	**41**	**25**	**15**	**19**	**120**
Physician	*141*	*128*	*54*	*42*	*9*	*7*	*47*	*37*	*18*	*14*	*13*	-----
Only [3]	129	118	44	37	9	8	47	40	18	15	11	-----
Preceded by interne or student [4]	6	5	5	----	----	----	----	----	----	----	1	-----
Interne or student only	6	5	5	----	----	----	----	----	----	----	1	-----
Midwife	*139*	*41*	*9*	----	*4*	----	*22*	----	*6*	----	*6*	*92*
Only	92	-----	----	----	----	----	----	----	----	----	-----	92
Followed by physician	47	41	9	----	4	----	22	----	6	----	6	-----
Other attendant	*13*	*3*	*1*	----	----	----	*1*	----	*1*	----	-----	*10*
Only	10	-----	----	----	----	----	----	----	----	----	-----	10
Followed by physician	3	3	1	----	----	----	1	----	1	----	-----	-----
None	*10*	-----	----	----	----	----	----	----	----	----	-----	*10*
Not reported	*8*	-----	----	----	----	----	----	----	----	----	-----	*8*

See footnotes [3] [4], p. 124.

Of the women who were attended at delivery by physicians (including internes and medical students) and who died of sepsis, 34 percent were delivered with technique that was aseptic throughout the confinement as far as is known; while of those who died of other puerperal causes 48 percent were said to have been delivered with completely aseptic technique. The proportion of cases in which aseptic technique was used throughout the confinement is possibly overestimated, as it is based on physicians' memory of their own procedure and on hospital records. Breaks in technique may have occurred unnoticed; at any rate, breaks were seldom recorded.

Unfortunately no inquiry was made as to the use of masks in the delivery room. This was, however, probably infrequent at the time these deaths occurred. Most of the recent researches proving the importance of spray-borne bacteria in the epidemiology of puerperal sepsis have been published since this study was begun.

The frequency of aseptic technique was approximately the same at the confinements of colored women and of white women who died of sepsis. The technique of the principal physician at the confinement, reported in 942 cases of white women, was described as aseptic in 381 cases (40 percent), attempted aseptic in 145 cases (15 percent), clean but not sterile in 335 cases (36 percent), and dirty in 81 cases (9 percent). At the confinements of 172 colored women for which the technique was reported, it was aseptic in 64 cases (37 percent), attempted aseptic in 13 cases (8 percent), clean but not sterile in 70 cases (41 percent), and dirty in 25 cases (15 percent).

VAGINAL EXAMINATIONS AND USE OF RUBBER GLOVES

Vaginal examinations and the use of rubber gloves by physicians in charge of the confinement of these women who died of sepsis are shown in table 72. This does not include vaginal examinations by other physicians at these confinements, nor examinations by midwives or nurses.

TABLE 72.—*Vaginal examinations and use of rubber gloves by principal physician*[1] *at confinement of women dying from puerperal septicemia and from all other puerperal causes who had reached the last trimester of pregnancy*

Vaginal examinations and cause of death	Women dying from puerperal causes who had reached last trimester				
	Total	Use of rubber gloves by physician			
		Used	Not used	Not reported	Inapplicable [2]
Total	**4,965**	**3,162**	**688**	**455**	**660**
Puerperal septicemia	*1,529*	*926*	*212*	*130*	*261*
No vaginal examinations	315	250	48	17	
Vaginal examinations	832	637	159	36	
1	238	211	19	8	
2	156	129	25	2	
3 or more	262	167	84	11	
Number not reported	176	130	31	15	
No report on vaginal examinations	121	39	5	77	
Inapplicable [2]	261				261
All other puerperal causes	*3,436*	*2,236*	*476*	*325*	*399*
No vaginal examinations	774	574	141	59	
Vaginal examinations	1,933	1,551	325	57	
1	633	524	81	28	
2	409	342	63	4	
3 or more	509	385	117	7	
Number not reported	382	300	64	18	
No report on vaginal examinations	330	111	10	209	
Inapplicable [2]	399				399

---

[1] When there was more than 1 physician the one who did the actual delivery or who was finally in charge if the woman died undelivered was called the principal physician.

[2] No physician or no report as to physician.

If the percentages are compared with those in cases of death from other puerperal causes, they may be seen to be, in general, similar. The chief differences are that more of the women who died of sepsis had 3 or more vaginal examinations, and fewer of those who had 3 or more vaginal examinations had had rubber gloves used.

Of the 656 women who died of sepsis after reaching the last trimester and for whom information as to the number of vaginal examinations was obtained, 262 (40 percent) had 3 or more vaginal examinations. Of the 1,551 women who died of other puerperal causes for whom the number of vaginal examinations was reported, 509 (33 percent) had 3 or more vaginal examinations. Rubber gloves had been used for 167 (67 percent) of the 251 women dying of sepsis as compared with 385 (77 percent) of the 502 dying from other puerperal causes who had 3 or more vaginal examinations and for whom a report as to use of rubber gloves was obtained. The physicians finally in charge of the delivery are known to have examined vaginally, three times or more without rubber gloves, 84 women who died of sepsis after reaching the third trimester. This is 13 percent of the 635 women who died of sepsis for whom the number of vaginal examinations and the use of rubber gloves were reported. Of the 1,512 women who died of other puerperal causes and about whom these same facts were known, 117 (8 percent) were examined three times or more without rubber gloves by the physician in charge of the case.

RECTAL EXAMINATIONS

Rectal examinations only were made by the principal physician in 75 (13 percent) of the 569 cases of death from sepsis and in 108 (10 percent) of the 1,044 cases of death from other puerperal causes in which information was obtained and in which there had not been an operation for delivery—a difference that is not statistically significant.

PREPARATION OF PATIENT

Inquiries were made as to the preparation of the patient for operation in cases of death from sepsis following therapeutic abortion or operation for ectopic gestation as well as in delivery cases. Information was obtained as to shaving and scrubbing in 1,348 cases, including some cases of women delivered by midwives. Of these, 645 (48 percent) had been shaved and scrubbed; 263 (20 percent) were neither shaved nor scrubbed; 428 (32 percent) had been scrubbed only; and 12 (1 percent) had been shaved only.

A report on the use of antiseptics was obtained in 1,356 cases. Some antiseptic had been used in 1,094 (81 percent) of the cases; none had been used in 262 (19 percent). At least 172 women who died of sepsis had been neither scrubbed nor shaved, nor was an antiseptic used. An antiseptic was used in the cases of 76 women, evidently with the intention of making good the lack of other preparation.

HOSPITAL TREATMENT

Of the 2,948 women who died of puerperal septicemia, 1,950 (66 percent) had hospital treatment (table 73). Only 618 of them, however, were known to have had their delivery or abortion in the hospital; 1,301 were known to have had their delivery or abortion outside the hospital; 25 died undelivered; and for 6 the place of delivery or abortion was not reported. The sepsis from which these women died developed in the hospital in 420 of the 601 cases of women who delivered or aborted in hospitals for whom place of development of sepsis was reported, and in 26 cases of women who delivered or aborted elsewhere. However, at least 69 of these 420 women had had vaginal examinations or other vaginal manipulations which may have been responsible for the sepsis before admission to the hospital.

TABLE 73.—*Place of development of sepsis and hospitalization at delivery or abortion of women dying from puerperal septicemia*

Place of development of sepsis	Women dying from puerperal septicemia				
	Total	Delivery or abortion in hospital	Delivery or abortion not in hospital	Place of delivery or abortion not reported	Not delivered
Total	**2,948**	**618**	**2,299**	**6**	**25**
Hospitalized	*1,950*	*618*	*1,301*	*6*	*25*
Sepsis developed in hospital	446	420	26		
Other septic cases in hospital	*51*	*47*	*4*		
No other septic cases in hospital	*139*	*134*	*5*		
No report on other septic cases in hospital	*256*	*239*	*17*		
Sepsis not developed in hospital	1,467	181	1,262		24
Place of development not reported	37	17	13	6	1
Not hospitalized	*998*		*998*		

In the majority (256) of the 446 cases in which sepsis developed in the hospital it was impossible to find out whether or not there had been other septic patients in the hospital at the time. Other septic cases had been in the hospital at the same time as 51 of these women, but no other septic cases had been in the hospital at the same time as the remaining 139.

There were 898 hospital deaths from sepsis of women who had reached the last trimester. But only 454 were delivered in the hospital, and 105 of the 454 were reported to have had vaginal examination or attempted operative delivery before admission to the hospital. These 105 constituted 27 percent of the 396 women delivered in the hospital for whom a report was obtained as to manipulation.

INTERVAL BETWEEN DELIVERY OR ABORTION AND DEATH

Among the 2,948 women who died from puerperal septicemia the interval between delivery or abortion and death was reported for 2,673 who aborted or were delivered before death. Death occurred within the first week in 596 (22 percent) of these 2,673 cases; in the second week in 804 cases (30 percent); in the third week in 454 cases (17 percent); in the fourth week in 241 cases (9 percent); and later than this, in 578 cases (22 percent).

SEPSIS DEATH RATES AMONG WHITE AND COLORED AND URBAN AND RURAL GROUPS IN THE DIFFERENT STATES

The mortality rates from puerperal sepsis were higher among colored than among white women, and higher in the cities than in rural districts. This is true of sepsis following delivery as well as of sepsis following abortion. In tables 74, 75, and 76 the deaths from sepsis are divided into those occurring after the beginning of the seventh month of gestation and before that time the latter including sepsis following abortion and ectopic gestation in the first two trimesters. Sepsis caused the death of 1,403 women who had not reached the last trimester of pregnancy, 1,324 of these 1,403 deaths following abortions. (See also Abortions, p. 105.) The differences in the mortality rates from sepsis in the different States are due in part to the proportions of deaths from sepsis following abortion, and to the proportions of urban and rural and white and colored women in the different States.[3]

Table 74.—*Number of deaths, mortality rate, and trimester of pregnancy among white and colored women dying in urban and rural areas from puerperal septicemia*

Color and area	Women dying from puerperal septicemia						
	Total		Trimester of pregnancy				
			First two		Last		Not reported
	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	
Total	**2,948**	**25.1**	**1,403**	**11.9**	**1,529**	**13.0**	**16**
White	2,437	23.1	1,209	11.4	1,218	11.5	10
Colored	511	42.4	194	16.1	311	25.8	6
Urban	*1,543*	*33.5*	*819*	*17.8*	*719*	*15.6*	*5*
White	1,316	31.1	721	17.0	592	14.0	3
Colored	227	59.8	98	25.8	127	33.5	2
Rural	*1,405*	*19.6*	*584*	*8.2*	*810*	*11.3*	*11*
White	1,121	17.7	488	7.7	626	9.9	7
Colored	284	34.4	96	11.6	184	22.3	4

---

[3] See footnote 4, p. 131.

TABLE 75.—*Number of deaths, mortality rate, and trimester of pregnancy among women dying from puerperal septicemia in urban and rural areas of each State included in the study*

State	Women dying from puerperal septicemia						
	Total		Trimester of pregnancy				
			First two		Last		Not reported
	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	
Total	**2,948**	**25.1**	**1,403**	**11.9**	**1,529**	**13.0**	**16**
Alabama	394	30.1	140	10.7	247	18.9	7
California	206	24.7	115	13.8	91	10.9	
Kentucky	279	22.9	122	10.0	153	12.6	4
Maryland	148	23.0	73	11.4	75	11.7	
Michigan	582	29.4	314	15.9	268	13.5	
Minnesota	190	18.9	84	8.4	104	10.4	2
Nebraska	143	25.6	81	14.5	62	11.1	
New Hampshire	33	18.9	10	5.7	23	13.2	
North Dakota	60	20.2	25	8.4	35	11.8	
Oklahoma	128	29.8	67	15.6	59	13.7	2
Oregon	70	24.4	47	16.4	23	8.0	
Rhode Island	54	20.2	25	9.3	29	10.8	
Virginia	304	26.5	117	10.2	187	16.3	
Washington	135	29.0	92	19.8	42	9.0	1
Wisconsin	222	19.3	91	7.9	131	11.4	
URBAN							
Total	**1,543**	**33.5**	**819**	**17.8**	**719**	**15.6**	**5**
Alabama	132	57.7	58	25.4	72	31.5	2
California	133	27.4	84	17.3	49	10.1	
Kentucky	72	31.5	33	14.4	38	16.6	1
Maryland	105	28.8	56	15.3	49	13.4	
Michigan	433	36.0	242	20.1	191	15.9	
Minnesota	97	25.3	50	13.1	47	12.3	
Nebraska	62	45.5	44	32.3	18	13.2	
New Hampshire	19	20.9	3	3.3	16	17.6	
North Dakota	13	32.9	6	15.2	7	17.7	
Oklahoma	43	51.2	24	28.6	18	21.4	1
Oregon	34	29.1	20	17.1	14	12.0	
Rhode Island	52	22.6	23	10.0	29	12.6	
Virginia	135	53.6	64	25.4	71	28.2	
Washington	86	35.3	62	25.4	23	9.4	1
Wisconsin	127	24.2	50	9.5	77	14.7	
RURAL							
Total	**1,405**	**19.6**	**584**	**8.2**	**810**	**11.3**	**11**
Alabama	262	24.2	82	7.6	175	16.2	5
California	73	20.9	31	8.9	42	12.0	
Kentucky	207	20.9	89	9.0	115	11.6	3
Maryland	43	15.5	17	6.1	26	9.3	
Michigan	149	19.2	72	9.3	77	9.9	
Minnesota	93	15.0	34	5.5	57	9.2	2
Nebraska	81	19.2	37	8.8	44	10.4	
New Hampshire	14	16.7	7	8.4	7	8.4	
North Dakota	47	18.3	19	7.4	28	10.9	
Oklahoma	85	24.6	43	12.4	41	11.9	1
Oregon	36	21.2	27	15.9	9	5.3	
Rhode Island	2	5.4	2	5.4			
Virginia	169	18.9	53	5.9	116	13.0	
Washington	49	22.2	30	13.6	19	8.6	
Wisconsin	95	15.2	41	6.6	54	8.6	

TABLE 76.—*Number of deaths, mortality rate, and trimester of pregnancy among white and colored women dying from puerperal septicemia in specified States having 2,000 or more colored births annually*

State and color	Women dying from puerperal septicemia						
	Total		Trimester of pregnancy				
			First two		Last		Not reported
	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	Number	Rate per 10,000 live births	
WHITE							
Alabama	204	24.0	80	9.4	122	14.4	2
California	191	24.3	106	13.5	85	10.8	----------
Kentucky	232	20.3	99	8.7	129	11.3	4
Maryland	102	19.9	56	10.9	46	9.0	----------
Michigan	551	28.8	299	15.6	252	13.2	----------
Oklahoma	104	25.7	56	13.8	47	11.6	1
Virginia	171	21.2	67	8.3	104	12.9	----------
COLORED							
Alabama	190	41.3	60	13.1	125	27.2	5
California	15	31.0	9	18.6	6	12.4	----------
Kentucky	47	60.9	23	29.8	24	31.1	----------
Maryland	46	35.0	17	12.9	29	22.1	----------
Michigan	31	47.6	15	23.0	16	24.6	----------
Oklahoma	24	94.9	11	43.5	12	47.4	1
Virginia	133	39.3	50	14.8	83	24.5	----------

SEPTIC ABORTION IN THE DIFFERENT STATES

Deaths from sepsis following abortion make up a large proportion of the deaths assigned to puerperal sepsis in the international classification.[4] In the 15 States of the study 45 percent of the sepsis deaths followed abortion (table 77). In the individual States the proportion ranged from about a third in New Hampshire, Alabama, Virginia, and Wisconsin to nearly two thirds in Washington and Oregon. In the 15 States one fourth of all the deaths attributed to puerperal septicemia followed induced abortions. In the separate States the proportion varied considerably. In Washington 48 percent of all the puerperal-sepsis deaths on which there was a report followed induced abortion, as compared with only 7 percent in Alabama. This low proportion in Alabama is partly due to the large number of colored maternal deaths in that State, as in general smaller proportions of maternal deaths are preceded by induced abortions among colored women than among white women.

Mortality rates for sepsis following abortion and for sepsis not following abortion in the various States are shown in table 78. These are similar to the rates from sepsis in the first two and the last trimester. The mortality rates from septic abortion ranged from 6 deaths per 10,000 live births in New Hampshire to 18 in Washington. It is of interest to note that the death rates from septic abortion were low in New Hampshire and Rhode Island and in Wisconsin, Minnesota, and North Dakota. They were highest in Washington, Oregon, and Oklahoma, high in Nebraska and Michigan, and intermediate in the Southern States.

---

[4] That is, in the 1920 revision. In the 1929 revision abortion with septic conditions (no. 140) is a separate title. (See appendix B, p. 212.)

TABLE 77.—*Number and percentage of abortions of specified type among women dying from puerperal septicemia in each State included in the study*

State	Women dying from puerperal septicemia														
	Total	Report on abortion													No report on abortion
		Total	Total abortion		Spontaneous abortion		Therapeutic abortion		Induced abortion		Type of abortion not reported		No abortion		
			Number	Percent [1]	Number	Percent [1]	Number	Percent [1]	Number	Percent [1]	Number	Percent [1]	Number	Percent [1]	
Total	2,948	2,931	1,324	45	354	12	44	2	722	25	204	7	1,607	55	17
Alabama	394	387	135	35	75	19	4	1	28	7	28	7	252	65	7
California	206	206	102	50	18	9	6	3	64	31	14	7	104	50	------
Kentucky	279	275	118	43	37	13	3	1	55	20	23	8	157	57	4
Maryland	148	148	70	47	11	7	1	1	42	28	16	11	78	53	------
Michigan	582	581	296	51	66	11	8	1	183	31	39	7	285	49	1
Minnesota	190	188	77	41	21	11	4	2	43	23	9	5	111	59	2
Nebraska	143	143	80	56	18	13	3	2	51	36	8	6	63	44	------
New Hampshire	33	33	10	----	3	----	2	----	5	----	----	----	23	----	------
North Dakota	60	60	25	42	8	13	2	3	14	23	1	2	35	58	------
Oklahoma	128	126	67	53	19	15	1	1	34	27	13	10	59	47	2
Oregon	70	70	45	64	5	7	1	1	26	37	13	19	25	36	------
Rhode Island	54	54	25	46	5	9	1	2	18	33	1	2	29	54	------
Virginia	304	304	109	36	31	10	1	(2)	54	18	23	8	195	64	------
Washington	135	134	85	63	14	10	2	1	64	48	5	4	49	37	1
Wisconsin	222	222	80	36	23	10	5	2	41	18	11	5	142	64	------

[1] Not shown where number of women was less than 50.
[2] Less than 1 percent.

TABLE 78.—*Mortality rate [1] from puerperal septicemia following abortion and not following abortion in each State included in the study*

State	Mortality rate [1] from puerperal septicemia—	
	Following abortion	Not following abortion
Total	11.3	13.7
Alabama	10.3	19.2
California	12.2	12.4
Kentucky	9.7	12.9
Maryland	10.9	12.1
Michigan	15.0	14.4
Minnesota	7.7	11.1
Nebraska	14.3	11.3
New Hampshire	5.7	13.2
North Dakota	8.4	11.8
Oklahoma	15.6	13.7
Oregon	15.7	8.7
Rhode Island	9.3	10.8
Virginia	9.5	17.0
Washington	18.3	10.5
Wisconsin	7.0	12.4

[1] Deaths per 10,000 live births.

COMMENT BY ADVISORY COMMITTEE

That 40 percent of all the deaths in this study were of women who had such obvious and unmistakable signs of sepsis that there could be no question how they should be classified shows clearly the serious condition presented by this cause of maternal death.

The outstanding findings in regard to abortions followed by septicemia have already been commented on in the section on that subject.

No matter how the figures are analyzed, it is clear that the loss of life from sepsis is enormous. That in the last trimester of pregnancy 1,529 women of this series died of sepsis, 94 percent of whom had a spontaneous onset of labor and 65 percent a spontaneous termination of labor, is nothing short of appalling.

In this series of deaths the midwives had a larger percentage of deaths from sepsis than physicians. This fact, however, does not by any means take the onus of this state of affairs from the physicians. Lack of adequate nursing care at home undoubtedly had something to do with these bad results, but the ultimate responsibility for these deaths rests on the delivery technique of the physician. That technique was classed as aseptic in only 40 percent of the cases in which it was reported upon, and these usually occurred in hospitals. The frequency of vaginal examinations without gloves is to be noted, as well as the relative infrequency of rectal examinations. Preparation of the patient in the majority of the cases was inadequate. It is not surprising to find that under these conditions sepsis developed much earlier in operative cases than in spontaneous deliveries. It is also to be noted that in cases of long labor signs of sepsis appeared earlier.

The deaths of 420 women delivered in hospitals from sepsis that developed in the hospital show clearly that the technique in the hospitals was unsatisfactory.

In many of the septic deaths classified as abortions the physician surely cannot be held responsible. It is admitted that many were induced, and there is no way of telling how many of the so-called spontaneous abortions also were induced. Moreover, infection was present in many of these cases when the physician was called. But the frequency with which curettage was done on these septic cases is not justifiable.

In the cases in the last trimester there is no such excuse for the bad results obtained as may be offered in the abortions. Complications were present in many instances in the last trimester, and operative procedures were necessary, but these facts do not excuse the physicians for the poor technique which they themselves admitted.

What is the reason for the existence of this condition? It is due to lack of proper teaching of obstetrics in some of the medical schools, lack of opportunity to deliver a sufficient number of normal cases, and almost total lack of experience in the simplest obstetric operating, or else it is due to the willful disregard by careless physicians of the fundamentals of asepsis.

The large number of fatal cases of puerperal infection are in the majority of instances due to infection that is introduced from without. Its prevention, therefore, lies in carrying out proper obstetric procedures, consisting chiefly of proper aseptic technique and carrying out only definitely indicated obstetric operations. It must be remembered, however, that there are a certain number of cases of puerperal infection which are endogenous in character; that is, they are due to organisms which the patient harbors chiefly in her birth canal. This type of infection forms another obstetric problem.

PUERPERAL PHLEGMASIA ALBA DOLENS, EMBOLUS, SUDDEN DEATH

In the States and years of this study 337 deaths were assigned to phlegmasia alba dolens, embolus, sudden death (number 147 of the international list) from information given on death certificates.[1] At interview with the attending physicians 51 of these deaths were attributed to other causes—most of them to puerperal sepsis or puerperal hemorrhage and 3 to nonpuerperal causes. However, 58 deaths were added to the original group as a result of additional information or of the physician's change of opinion—26 from the indefinite classification "other accidents of labor", 19 from puerperal albuminuria and convulsions, 7 from accidents of pregnancy, 4 from septicemia, and 2 from puerperal hemorrhage. The group attributed to this cause after interview, therefore, numbered 344.

Not all deaths for which puerperal phlebitis, embolism, or sudden death appears on the certificate are assigned to that cause in the international classification. Ectopic gestation, puerperal hemorrhage, Cesarean section, operative delivery, ruptured uterus, puerperal sepsis, and puerperal albuminuria and convulsions, as well as some nonpuerperal causes, take precedence. Deaths attributed to these puerperal causes for which puerperal phlebitis or embolism was given as the principal contributory cause numbered 242, for 123 of which the primary cause was puerperal sepsis.

The heading "phlegmasia alba dolens, embolus, sudden death" in itself indicates a certain amount of vagueness. Phlebitis, strictly speaking, is a manifestation of puerperal infection, and the symptoms of embolus are not always definite. The diagnosis was not always clear, and in many cases the exact cause of death was unknown and could not be demonstrated. An autopsy was reported in only 25 cases. Some of the deaths may have been due to other causes, but the attending physician believed the deaths due to embolism, and they were so included.

DEATHS ATTRIBUTED TO EMBOLISM

Of the 344 deaths attributed after interview to phlegmasia alba dolens, embolus, sudden death, 303 were attributed to embolism, in most cases pulmonary; 10 to thrombosis, coronary, cerebral, or mesenteric; 10 to phlegmasia alba dolens; and 21 to "sudden death." The following history is typical of the deaths from embolism:

> The patient had a normal delivery and a normal puerperium until the ninth day, when on getting out of bed she was seized with a pain in her chest, became dyspneic and cyanotic, and died immediately.

Phlebitis was diagnosed either clinically or at autopsy in 52 of the 303 cases in which death was thought due to embolism. Only those cases were included here in which there were no other gross evidences of puerperal infection. Even though these deaths and some others were actually due to puerperal infection, the international classification was followed in attributing them to this group.

---

[1] Puerperal phlegmasia alba dolens, embolus, sudden death is no. 148 in the 1929 revision of the International List of Causes of Death.

Of the 303 deaths attributed to embolism, 10 occurred during delivery. The diagnosis may be questioned particularly in these cases. In one case embolism was proved by autopsy. In two the histories were particularly suggestive of ruptured uterus, though the attending physicians favored diagnosis of embolism.

Of the 303 women whose deaths were attributed to embolism, 220 were said to have had respiratory distress, 41 were said not to have had it, and for 42 no information was obtained on this point. Cyanosis was reported present in 197 and not present in 53; for 53 there was no report. Cyanosis was reported present in 183 of the 220 embolus cases with respiratory distress, and 28 of the 41 women said to have had no respiratory distress were reported to have had no cyanosis. In many cases there was no report on one or on both of these symptoms, a circumstance probably due to the suddenness of the death. That the absence of reported cyanosis or respiratory distress does not rule out embolism is shown in the following case:

> The patient had a normal delivery, first-degree laceration. The puerperium was normal. There was no rise in temperature after delivery or throughout the puerperium; no pains in groins or legs. On the morning of the ninth day three silkworm gut sutures were removed. In the afternoon when the patient was put into a wheel chair she was seen to slip down in the chair. She was put back to bed and died within ten minutes. Dyspnea and cyanosis were said to be absent. The autopsy showed a large embolus in the left pulmonary artery. The site of the primary phlebitis with thrombosis was found in the left hypogastric vein. There were no gross evidences of pelvic infection. Microscopic sections of the uterine wall revealed "low-grade myometritis but no acute infection."

DEATHS FOLLOWING ABORTION

Abortions preceded 44 of the 53 deaths of women who had not reached the third trimester, which were attributed to puerperal phlegmasia alba dolens, embolus, sudden death. The abortion was said to have been spontaneous in 25 cases, induced in 13 cases, therapeutic in 4 cases, and of unknown type in 2 cases.

TYPE OF DELIVERY

The deaths of 291 women who had reached the last trimester of pregnancy were attributed to phlegmasia alba dolens, embolus, and sudden death. Of these women 12 died undelivered, and for 7 the termination of labor was not reported. Of the 272 who were delivered, delivery was spontaneous for 203 women (75 percent) and artificial for 69 (25 percent). This is a larger proportion of spontaneous deliveries than was found among women whose deaths were attributed to any of the important puerperal causes. (Deaths from embolism in connection with Cesarean section or other operative deliveries are ordinarily assigned to the operation as a cause of death. In 40 such cases phlegmasia alba dolens, embolus, sudden death was given as the principal contributory cause.) In 31 of the 69 cases of artificial termination of labor, 3 or more days elapsed between the operation and death with symptoms of embolism; but in the remaining 38 cases death came sooner—in 14 of them 1 hour or less after delivery—although usually with symptoms clearly suggestive of embolism. In 6 cases, however, the history was suggestive of ruptured uterus. (Five of these died 1 hour or less after delivery.)

INTERVAL BETWEEN DELIVERY OR ABORTION AND DEATH

Death occurred within the first day after delivery in 33 percent of the 316 cases for which the interval between delivery or abortion and death from phlegmasia alba dolens, embolus, sudden death was reported, and within the first week in 46 percent. Twenty-nine percent of the deaths took place in the second week, 9 percent in the third week, 8 percent in the fourth week, and 9 percent in the fifth week or later. (See appendix table VI, p. 190.)

MORTALITY RATES IN THE STATES AS RELATED TO OTHER ACCIDENTS OF LABOR AND TO MEDICAL CARE

The mortality rate for puerperal phlegmasia alba dolens, embolism, sudden death, based on the deaths attributed to this cause following interview, varied from 1.0 per 10,000 live births for Kentucky to 7.4 for New Hampshire, the rate for the group of States during the period of the study being 2.9 per 10,000 (table 79). If the State rates for embolism are compared with those for other accidents of labor exclusive of Cesarean section and operative deliveries (no. 145c), also shown in table 79, it will be seen that in general the States with low death rates from embolism have high death rates from "other accidents of labor." States with high death rates from puerperal phlegmasia alba dolens, embolism, sudden death are usually the States in which more women received medical attention before they were moribund. It is likely, then, that some of the deaths attributed to the vague "other accidents of labor" would have been attributed to embolism if more information had been obtained.

Table 79.—*Relation between mortality rates from puerperal phlegmasia alba dolens, embolus, sudden death and (a) "other accidents of labor", and (b) percentage of women having medical care before they were moribund among those who died from all puerperal causes in each State included in the study*

State	Mortality rate[1] from puerperal phlegmasia alba dolens, embolus, sudden death	Mortality rate[1] from "other accidents of labor"	Percent of women having medical care before they were moribund among those who died from all puerperal causes
Kentucky	1.0	3.2	85.7
Alabama	1.9	6.0	83.9
Virginia	1.9	4.7	88.0
Oklahoma	2.1	4.7	94.6
Maryland	2.5	3.0	92.7
California	2.5	3.5	92.6
North Dakota	3.0	4.4	87.3
Minnesota	3.1	2.6	93.8
Washington	3.2	3.9	91.1
Oregon	3.5	2.1	92.1
Michigan	3.8	2.6	94.7
Wisconsin	4.0	2.1	93.8
Nebraska	4.5	2.7	94.2
Rhode Island	5.2	3.4	94.5
New Hampshire	7.4	2.9	95.4

Coefficients of correlation and probable errors:

(*a*) Mortality rate from puerperal phlegmasia alba dolens, embolus, sudden death, and "other accidents of labor."

$$r=-0.455\pm0.138$$

(*b*) Mortality rate from puerperal phlegmasia alba dolens, embolus, sudden death, and percentage of women having medical care before they were moribund among those who died from all puerperal causes.

$$r=+0.653\pm0.100$$

---

[1] Deaths per 10,000 live births.

PROPORTION OF MATERNAL DEATHS AND MORTALITY RATES AMONG WHITE AND COLORED AND URBAN AND RURAL GROUPS

The proportion of maternal deaths due to puerperal phlegmasia alba dolens, embolus, sudden death was the same among the urban as among the rural women for both white and colored—5 percent of each among the white and 2 percent of each among the colored. There was some difference between urban and rural, however, in the rates per 10,000 live births. The urban white rate was 3.4 and the rural white rate 2.7; the urban colored rate was 2.9 and the rural colored 2.3. It is likely that these differences are due largely to differences in diagnosis.

COMMENT BY ADVISORY COMMITTEE

Little comment on this section is necessary. This number in the international list may cover many deaths of uncertain cause. A death certificate under this heading is oftentimes accepted without proper understanding of the circumstances of the death.

Twenty-five percent of the women who reached the last trimester died following operative delivery. Some had symptoms clearly suggestive of embolism, but in others the history obtained was of ruptured uterus. Many of the spontaneously delivered patients showed the classical symptoms of embolism with no demonstrable phlebitis. Thrombosis and embolism are the results of infection; and so far as infections are preventable, thrombosis and embolism are preventable.

TOXEMIAS OF PREGNANCY

Thirty percent (2,221) of all the deaths in the study were preceded by some presumably toxic condition as the chief cause or the chief contributory cause. Most of these deaths—1,900, or 26 percent of the total—were due to puerperal albuminuria and convulsions (no. 148 in the International List of Causes of Death), and 220 that were attributed to other primary causes had albuminuria and convulsions as the principal contributory cause. Sixty-one deaths were attributed to pernicious vomiting of pregnancy, and 40 more that were attributed to causes other than albuminuria and convulsions had pernicious vomiting as the chief contributory cause.

ASSIGNMENT OF TOXEMIAS ACCORDING TO INTERNATIONAL LIST

Deaths resulting from the toxemias of pregnancy are assigned in the 1920 revision of the international list to various numbers, most of them, as has been noted, to no. 148, puerperal albuminuria and convulsions. Under this heading are included deaths that were certified by the physician as due to toxemia of pregnancy, to pyelitis or pyelonephritis in pregnancy, or to eclampsia, acute nephritis, nephritis vaguely defined, or uremia associated with pregnancy or childbirth. But death certificates on which a cause ordinarily assignable to puerperal albuminuria and convulsions appears in company with puerperal sepsis, puerperal hemorrhage, ectopic gestation, or ruptured uterus are assigned to these latter causes. Death certificates of women between the ages of 15 and 45 containing terms suggestive of albuminuria and convulsions but unqualified by statement of pregnancy are queried by the State divisions of vital statistics or by the United States Bureau of the Census. As a result of queries sent out by the Bureau of the Census alone, the number of deaths assigned to no. 148, puerperal albuminuria and convulsions, in the United States death-registration area was increased 3.5 percent in 1927 and 4.1 percent in 1928.

Deaths certified as due to pernicious vomiting of pregnancy or hyperemesis gravidarum, if the term appears alone, are assigned to no. 143, accidents of pregnancy. But if any other puerperal cause also appears on the death certificate the death is assigned to the other cause. For example, a death certified as due to *toxic* vomiting of pregnancy would be listed with puerperal albuminuria and convulsions.[1]

Nephritis definitely stated to be chronic (no. 129a) takes precedence over puerperal albuminuria and convulsions and the less definite puerperal causes. But all puerperal causes taking precedence over puerperal albuminuria and convulsions, and also abortion, part of other accidents of pregnancy, Cesarean section, and puerperal embolism, take precedence over chronic nephritis. Included in the study were 65 deaths with a puerperal primary cause which had chronic nephritis as a contributory cause.

---

[1] In the 1929 revision of the international list the toxemias are divided into puerperal albuminuria and eclampsia (no. 146) and other toxemias of pregnancy (no. 147), which includes pernicious vomiting. The rules of precedence given in the text for puerperal albuminuria and convulsions apply to both new titles. The new no. 146 takes precedence over the new no. 147; that is, a death certified as due to toxemia of pregnancy would be assigned to no. 147, and one certified as due to toxemia of pregnancy with convulsions would be assigned to no. 146.

Because of the precedence of chronic nephritis over certain puerperal causes, a number of deaths of pregnant or parturient women from chronic nephritis are lost entirely in the puerperal group. Just how many were so lost in the years and States of the maternal-mortality study is not known. However, the tabulation of contributory causes of death in relation to primary causes, made by the United States Bureau of the Census for the registration area in the continental United States for 1925 (the last year in which such a tabulation was made), shows that 206 of the 93,587 deaths assigned to chronic nephritis had a puerperal contributory cause. It is probable that there were other deaths of pregnant or parturient women with the puerperal contributory cause not stated, as certificates showing nephritis definitely stated to be chronic (no. 129a) are not queried as to whether or not there is a puerperal contributory cause. In the death-registration area of 1925 there were 15,315 deaths assigned to puerperal causes, a little more than twice the number included in this study.

Every year there are more deaths from chronic nephritis among women of child-bearing age than among men in the same age group, though at other ages there are more deaths from chronic nephritis among men. Some of this excess of female deaths in the 15- to 44-year age group is undoubtedly due to deaths in which pregnancy played some part. In the States and during the years of the present study the deaths of 24,306 males and 19,887 females of known ages were assigned to chronic nephritis. Of the deaths of males, 2,282 (9 percent) were in the 15- to 44-year age group and 22,024 at other ages. Of the females 2,566 (13 percent) died in the 15- to 44-year age period and 17,321 at other ages.

Deaths from acute yellow atrophy of the liver likewise are omitted from the puerperal group, unless puerperal sepsis also appears on the death certificate. In 1925 the number of deaths in the death-registration area assigned to acute yellow atrophy of the liver (no. 120 in the international list) was 469. Of these deaths 64 had a puerperal contributory cause, but this is quite possibly an understatement of the entire number with such a cause, as a contributory cause was given in only 223 cases. Two deaths assigned to puerperal septicemia in 1925 had acute yellow atrophy of the liver as a contributory cause. In the States in the death-registration area[2] of that year, 273 of the deaths from acute yellow atrophy of the liver were of females and 180 of males. The excess of female deaths was practically all in the 15- to 44-year age group.

PUERPERAL ALBUMINURIA AND CONVULSIONS

As a puerperal cause of death, albuminuria and convulsions was exceeded in importance, numerically, only by puerperal septicemia. In the last trimester of pregnancy it was of equal importance with puerperal septicemia—each accounting for 31 percent of the deaths of women in this period. Among the women in rural areas, both white and colored, in the last trimester, it was a cause of death of numerically greater importance than sepsis. (See appendix table I, p. 183.)

---

[2] Exclusive of registration cities in nonregistration States.

CHANGES IN ASSIGNMENT OF DEATHS TO ALBUMINURIA AND CONVULSIONS

Nineteen hundred deaths were attributed after interview to the group albuminuria and convulsions. Physicians had certified 2,006 deaths as due to this cause, but the interviews showed that incomplete or incorrect information had been given for 180, so that only 1,826 of this group were correctly certified. The additional 74 making up the 1,900 deaths were certified as due to other puerperal causes but were shown by interview to have been due to albuminuria and convulsions.

Of the 180 cases originally but incorrectly certified as due to albuminuria and convulsions, 140 were attributed after the interviews to other puerperal causes—69 to septicemia, 22 to accidents of pregnancy, 19 to embolus, sudden death, and 30 to various other causes. The remaining 40 were shown by interview to be properly attributable to nonpuerperal causes and hence were omitted from the study. Thirty-two of the 40 were attributed to chronic nephritis. Most of these were cases of women whose last pregnancies had occurred several years before their death, or who had been in sufficiently serious condition to warrant a physician's care before the onset of their last pregnancy. There were probably many more deaths due, in the final analysis, to chronic nephritis and pregnancy, which should have been assigned to chronic nephritis; but the evidence in these other cases was less definite and therefore they were not excluded.

PRIMARY CAUSES OF DEATHS HAVING ALBUMINURIA AND CONVULSIONS AS CHIEF CONTRIBUTING CAUSE

Of the 220 deaths attributed to other primary causes that had albuminuria and convulsions as the principal contributory cause of death, 168 were attributed to puerperal sepsis (see Puerperal Septicemia, p. 116), 44 to puerperal hemorrhage, 5 to ectopic gestation, 2 to abortion, and 1 to ruptured uterus.

TYPES OF TOXEMIA INCLUDED

For some of the 1,900 deaths having puerperal albuminuria and convulsions as the primary cause it was possible to differentiate the types of toxemia, but for many the exact diagnosis could not be made. Often the patient was first seen by the physician when she was in coma or convulsions, and was delivered at once, and died, so that a complete history was not taken and no laboratory work was done. Even when there was earlier medical attention, laboratory work other than urinalyses and blood-pressure examination was seldom done, and often there was not even blood-pressure examination.

For these reasons no attempt was made at pathologic classification of these deaths, but the following considerations may give some idea of the types of toxemias included. Convulsions were known to have preceded the deaths of 1,305 of the 1,900 women; 521 had had no convulsions; and in 74 cases it was not ascertained whether or not the women had had convulsions. Seventy-eight percent of the 814 known primiparae and 66 percent of the 946 known multiparae for whom data on this point were obtained had had convulsions. In 130 of the 1,900 cases the toxemia could have been called pernicious vomiting of pregnancy; these will be discussed in connection with the other deaths from pernicious vomiting. (See p. 151.) Death occurred before the women had reached the last trimester of pregnancy in 338 cases and after they had reached the third trimester in 1,549 cases; in 13 cases the duration of pregnancy was not known. Of the deaths early in pregnancy some were associated with pernicious vomiting; others were probably associated with chronic nephritis.

PRENATAL CARE RECEIVED

The prenatal care received by these women is shown in table 80. Eight hundred and fifty-four (49 percent) of the 1,756 women who had reached their third month of pregnancy before death and for whom there was a report as to prenatal care had had some prenatal care. This 49 percent includes 218 women (12 percent) who had had good prenatal care (grade I); 159 (9 percent) who had had indifferent care (grade II); 463 (26 percent) who had had poor care (grade III); and 14 (about 1 percent) whose care could not be graded. More of the white women than of the colored women who died had had prenatal care. (For criteria as to grades of prenatal care see Maternal Care, p. 40.)

TABLE 80.—*Trimester of pregnancy and grade of prenatal care received by white and colored women dying from puerperal albuminuria and convulsions*

Trimester of pregnancy and grade of prenatal care	Women dying from puerperal albuminuria and convulsions		
	Total	White	Colored
Total	**1,900**	**1,493**	**407**
Grade I	218	205	13
Grade II	159	149	10
Grade III	463	398	65
Ungraded	14	12	2
None	902	616	286
Not reported	127	96	31
Inapplicable [1]	17	17	----------
Last trimester	*1,549*	*1,210*	*339*
Grade I	130	124	6
Grade II	144	136	8
Grade III	396	344	52
Ungraded	10	9	1
None	786	532	254
Not reported	83	65	18
First two trimesters	*338*	*276*	*62*
Grade I	88	81	7
Grade II	15	13	2
Grade III	67	54	13
Ungraded	4	3	1
None	116	84	32
Not reported	31	24	7
Inapplicable [1]	17	17	----------
Trimester and prenatal care not reported	*13*	*7*	*6*

[1] Induced abortions and cases in which pregnancy terminated before the third month.

Table 80 also shows the grade of care received by the women who died, according to trimester of pregnancy. The 338 women who died before reaching the last trimester included 88 who had had grade I care and 15 who had had grade II care. (These 338 cases include 163 in which a spontaneous, therapeutic, or induced abortion preceded death, 174 in which there had been no abortion, and 1 in which there was no report as to the termination of the pregnancy.)

The time that elapsed between the patient's first visit to a physician for prenatal care and her death, and the grade of care received by patients who had been under a physician's supervision for varying lengths of time, are shown in table 81. Only about half of the women who had had grade I care had begun their prenatal care as much as 5 months before death. The period of pregnancy at which the patient first saw a physician and the period of pregnancy at which she died both affect the time during which the physician had the opportunity to give her prenatal care.

TABLE 81.—*Time between first visit of patient to physician and death and grade of prenatal care given to women dying from puerperal albuminuria and convulsions*

Time between first visit to physician and death	Women dying from puerperal albuminuria and convulsions							
	Total	Grade of prenatal care						
		I	II	III	Ungraded	None	Not reported	Inapplicable [1]
Total	1,900	218	159	463	14	902	127	17
Less than 1 month	81	1		80				
1 month, less than 2	151	13	13	125				
2 months, less than 3	150	31	41	77	1			
3 months, less than 4	102	26	35	41				
4 months, less than 5	84	34	14	36				
5 months, less than 6	62	23	15	24				
6 months, less than 7	97	39	24	34				
7 months, less than 8	65	35	10	19	1			
8 months or more	30	15	7	8				
Time not reported	159	1		19	12		127	
No prenatal care	902					902		
Inapplicable [1]	17							17

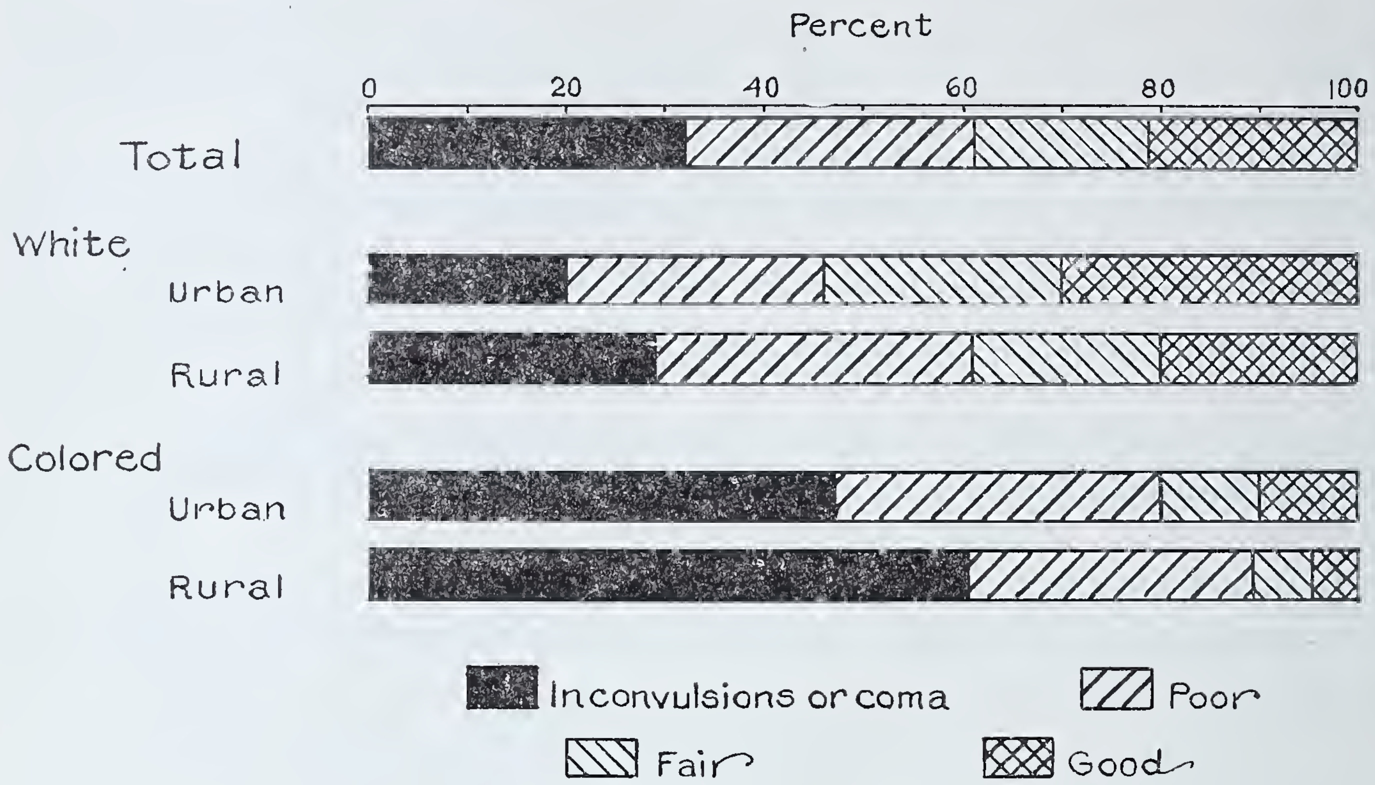
[1] Induced abortions and cases in which pregnancy terminated before the third month.

COOPERATION OF PATIENT WITH PHYSICIAN

The cooperation of the patient was said to be good in a little more than half the cases in which a report on this point was obtained. Criteria as to "good" and "poor" cooperation varied so widely among the physicians interviewed, however, that this statement is based on data representing only the expressed opinions of the individual physicians. The inquiry referred to cooperation after the contact between physician and patient was established; the failure of the patient to present herself early for prenatal care was not considered poor cooperation.

It is of interest that about one third of the women who died of albuminuria and convulsions could not have cooperated because they were in convulsions or in coma when first seen by the physician—or they were not seen before death.

CHART IX.—CONDITION WHEN FIRST SEEN BY PHYSICIAN OF WOMEN WHO DIED FROM PUERPERAL ALBUMINURIA AND CONVULSIONS



CONDITION OF PATIENT WHEN FIRST SEEN BY PHYSICIAN

The findings on this important question—What was the condition of the patient when she was first seen by the physician?—are given in table 82.

The condition of the patient when she was first seen by a physician in her present pregnancy was known in 1,723 cases. Of these women, 546 (32 percent) were in coma or were having, or had had, convulsions; 508 (29 percent) were otherwise in poor condition; 313 (18 percent) were in fair condition; only 356 (21 percent) were in good condition. More of the women who died in rural districts (36 percent) than in the urban districts (25 percent) and a larger proportion of the colored women (56 percent) than of the white (25 percent) were in coma or had had convulsions when first seen (chart IX).

The fact that only 54 percent of the urban white, 39 percent of the rural white, 20 percent of the urban colored, and 11 percent of the rural colored women who died of puerperal albuminuria and convulsions and whose condition was reported, were in good or even in fair condition when they were first seen by a physician is of tremendous significance, particularly in consideration of the higher mortality rates among the colored women. (See p. 16.)

TABLE 82.—*Condition when first seen by physician, of white and colored women and women dying in urban and rural areas from puerperal albuminuria and convulsions*

Condition of woman when first seen by physician	Women dying from puerperal albuminuria and convulsions					
	Total		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	1,900		777		1,123	
Condition reported	**1,723**	**100**	**717**	**100**	**1,006**	**100**
Good	356	21	191	27	165	16
Fair	313	18	154	21	159	16
Poor	508	29	193	27	315	31
In convulsions or coma	546	32	179	25	367	36
Condition not reported	**143**		**53**		**90**	
No physician	**34**		**7**		**27**	
WHITE						
Total	1,493		638		855	
Condition reported	**1,371**	**100**	**593**	**100**	**778**	**100**
Good	333	24	179	30	154	20
Fair	287	21	141	24	146	19
Poor	402	29	152	26	250	32
In convulsions or coma	349	25	121	20	228	29
Condition not reported	**102**		**40**		**62**	
No physician	**20**		**5**		**15**	
COLORED						
Total	407		139		268	
Condition reported	**352**	**100**	**124**	**100**	**228**	**100**
Good	23	7	12	10	11	5
Fair	26	7	13	10	13	6
Poor	106	30	41	33	65	29
In convulsions or coma	197	56	58	47	139	61
Condition not reported	**41**		**13**		**28**	
No physician	**14**		**2**		**12**	

BED TREATMENT AND HOSPITALIZATION

Other factors than prenatal care which are necessary for the prevention of deaths from toxemia are the early recognition of symptoms by the physician and prompt and judicious medical treatment. (See p. 153.)

Whether the patient goes to bed at the first appearance of symptoms of toxemia depends on the patient as well as on the physician. Of the 1,618 women whose deaths were attributed to puerperal albuminuria and convulsions and about whom information on this point was obtained, 426 did go to bed at first symptoms, but 1,192 did not.

Of the total of 1,900 women whose deaths were attributed to albuminuria and convulsions, 1,029 (54 percent) were hospitalized and 869 (46 percent) were not; hospitalization was not reported for 2. The great majority (866) of the hospitalized women did not reach a hospital until they were in a serious condition; 138 were sent to a hospital or were already in a hospital on the first appearance of symptoms; for 25 the condition at the time of hospitalization was not stated. Of the 866 women who were not hospitalized until they were in a serious condition, only 157 were stated to have been put to bed at home at the first appearance of symptoms.

More of the white women who died than of the colored had had hospitalization and bed treatment. Sixty-one percent of the white women, but only 30 percent of the colored women, were hospitalized, and of those that were hospitalized more of the colored women (94 percent) than of the white (85 percent) were in serious condition at the time of hospitalization. Of those for whom the question of bed treatment was reported, 29 percent of the white and 15 percent of the colored women were said to have been put to bed at the first appearance of symptoms.

A number of the women who were sent to the hospital at first symptoms improved under treatment and were allowed to go home, *only to return in convulsions.*

ONSET OF LABOR—ARTIFICIAL AND SPONTANEOUS

Twenty-six percent of those who died after reaching the last trimester of pregnancy had had artificial onset of labor. This includes 224 women who had had labor induced mechanically, such as by bougie, bag, or manual dilatation—in many cases accouchement forcé; 146 who had had Cesarean section when not in labor (see also Cesarean Section, p. 94); 10 who had had medical induction, such as pituitrin or quinine and castor oil; and 3 for whom the exact method was not reported. Fourteen percent died before the onset of labor.

TABLE 83.—*Onset of labor and trimester of pregnancy among white and colored women and women in urban and rural areas dying from puerperal albuminuria and convulsions*

Trimester of pregnancy and onset of labor	Women dying from puerperal albuminuria and convulsions									
	Total		White		Colored		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	1,900	------	1,493	------	407	------	777	------	1,123	------
Last trimester	1,549	------	1,210	------	339	------	607	------	942	------
Report on onset	**1,488**	**100**	**1,167**	**100**	**321**	**100**	**583**	**100**	**905**	**100**
Spontaneous	902	61	687	59	215	67	296	51	606	67
Artificial	383	26	335	29	48	15	206	35	177	20
No onset	203	14	145	12	58	18	81	14	122	13
No report on onset	**61**	------	**43**	------	**18**	------	**24**	------	**37**	------
First 2 trimesters	338	------	276	------	62	------	169	------	169	------
Report on onset	**334**	**100**	**274**	**100**	**60**	**100**	**167**	**100**	**167**	**100**
Spontaneous	69	21	56	20	13	22	37	22	32	19
Artificial	107	32	97	35	10	17	53	32	54	32
No onset	158	47	121	44	37	62	77	46	81	49
No report on onset	**4**	------	**2**	------	**2**	------	**2**	------	**2**	------
Trimester not reported	13	------	7	------	6	------	1	------	12	------

Of the women who died before reaching the last trimester, 47 percent died before the onset of labor, 21 percent had spontaneous onset, and 32 percent had artificial onset of labor.

A larger proportion of the white than of the colored women who died had artificial onset of labor (table 83).

Of the 361 women who died before the onset of labor, 158 died in the urban and 203 in the rural areas. In the last trimester larger proportions of the women who died in the rural than in the urban areas had had spontaneous onset of labor or no onset, while a larger proportion of the women who died in the urban areas had had artificial onset of labor (table 83).

TERMINATION OF LABOR—ARTIFICIAL AND SPONTANEOUS

Of those who reached the last trimester nearly one fifth died undelivered; of the remainder about half were delivered spontaneously and half artificially. Of the women who died before the last trimester half died undelivered, approximately a fourth had spontaneous termination of labor, and the remainder artificial termination (table 84).

A larger proportion of the colored women than of the white died undelivered, but there was practically no difference in the proportion of the deaths preceded by spontaneous delivery. Proportionately more of the women who died in the urban than in the rural areas had had operative deliveries, while more of the women who died in the rural areas were delivered spontaneously (table 84).

TABLE 84.—*Termination of labor and trimester of pregnancy among white and colored women and women in urban and rural areas dying from puerperal albuminuria and convulsions*

Trimester of pregnancy and termination of labor	Women dying from puerperal albuminuria and convulsions									
	Total		White		Colored		In urban areas		In rural areas	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	1,900	------	1,493	------	407	------	777	------	1,123	------
Last trimester	1,549	------	1,210	------	339	------	607	------	942	------
Report on termination	**1,513**	**100**	**1,185**	**100**	**328**	**100**	**595**	**100**	**918**	**100**
Spontaneous	614	41	469	40	145	44	187	31	427	47
Artificial	630	42	524	44	106	32	301	51	329	36
No termination[1]	269	18	192	16	77	23	107	18	162	18
No report on termination	**36**	------	**25**	------	**11**	------	**12**	------	**24**	------
First 2 trimesters	338	------	276	------	62	------	169	------	169	------
Report on termination	**334**	**100**	**273**	**100**	**61**	**100**	**167**	**100**	**167**	**100**
Spontaneous	86	26	69	25	17	28	48	29	38	23
Artificial	80	24	74	27	6	10	35	21	45	27
No termination[1]	168	50	130	48	38	62	84	50	84	50
No report on termination	**4**	------	**3**	------	**1**	------	**2**	------	**2**	------
Trimester not reported	13	------	7	------	6	------	1	------	12	------

[1] Includes cases in which there was no issue and in which delivery was postmortem.

OPERATIONS FOR DELIVERY

Operative delivery comprised part or all of the treatment of many of the women—46 percent of those dying from albuminuria and convulsions after they reached the last trimester for whom information as to operation is available. (See also Operations, pp. 68–69.) The actual operations performed for delivery in the last trimester are shown in appendix table XI (p. 196), and the type of principal operation for delivery is given in table 85. In this table manual removal of placenta is disregarded, and forceps and version combinations are included with versions. Of the 288 dilatations of the cervix, alone or in combination with other operation, 196 were known to be manual dilatations. In 12 cases the method of dilatation was not given. The 80 remaining dilatations were usually by bag but occasionally by bougie, packing of the cervix, or incision of the cervix. In the cases in which dilatation of cervix is given as the only operation the patient either delivered spontaneously or died undelivered.

TABLE 85.—*Type of principal operation for delivery performed on women dying from puerperal albuminuria and convulsions who had reached the last trimester of pregnancy*

Type of principal operation for delivery [1]	Women dying from puerperal albuminuria and convulsions who had reached last trimester	
	Number	Percent distribution
Total	1, 549	
No operation	813	
Operation	702	
Type reported	**701**	**100**
Cesarean section	200	29
Version	52	7
Dilatation of cervix and version	112	16
Forceps	152	22
Dilatation of cervix and forceps	101	14
Dilatation of cervix	62	9
Other	22	3
Type not reported	**1**	
No report on operation	**34**	

[1] Unsuccessful attempts at these operations were listed with the operations.

DELIVERY BEFORE AND AFTER DEATH, AND CONVULSIONS

Of the total of 1,900 women who died of albuminuria and convulsions, 437 (23 percent) were not delivered before death, some of them because they were moribund when the doctor arrived. (Three hundred and ninety-six were never delivered, and 41 had postmortem delivery, resulting in 10 live births.[3]) Of the group who died undelivered and for whom a report as to convulsions was obtained, 69 percent had convulsions.

---

[3] The time between the death of the mother and the birth of a living baby was said to be 5 minutes, 11 minutes, and 15 minutes in 1 case each. In 4 cases the delivery was done "immediately"; in 1 case "a few minutes" was said to intervene, and in 2 cases there was no report.

A number of women, both among those delivered before death and among those not delivered before death, died in their first convulsion. Of the women who died undelivered and had convulsions more than half (56 percent) died less than 12 hours after the first convulsion and about two thirds (69 percent) less than 24 hours afterward. Of the women who were delivered before death and had convulsions about one third (31 percent) died less than 12 hours after their first convulsion and almost half (47 percent), less than 24 hours afterward.

Of the women who were delivered before death and who died after having convulsions, 90 percent died within the first week after delivery (or abortion) and 56 percent within the first day.[4] About 2 percent lived 4 weeks or more.

Of the women who were delivered before death and whose deaths were attributed to puerperal albuminuria and convulsions but who did not have convulsions, 63 percent died within the first week after the delivery (or abortion) and 31 percent within the first day. Fourteen percent lived 4 weeks or more.

LIVE BIRTHS AND STILLBIRTHS

Of the women who were delivered in the last trimester 807 gave birth to live-born and 457 to stillborn children, and 18 had 1 live-born and 1 stillborn twin. There were 16 live births before the last trimester. Many of the other live-born infants also were premature, but no data were obtained as to the survival of these children.

LARGE PROPORTION OF PREVIOUS KIDNEY DISEASE

Past medical histories could be obtained from the attendant at delivery or death for only 38 percent of all the women whose deaths are included in the study and for the same proportion of the women who died of puerperal albuminuria and convulsions. The past medical histories that were obtained were not all complete. However, reference was made to some kidney disease in 240 (33 percent) of the 729 past histories obtained for women who died of puerperal albuminuria and convulsions. In the 2,105 medical histories obtained of women whose deaths were attributed to other causes, kidney disease was mentioned in 175 cases (8 percent).

PARITY AND AGE

Puerperal albuminuria and convulsions caused 36 percent of the deaths of primiparae; between 21 and 24 percent of the deaths of women in subsequent pregnancies, including the seventh; 18 percent of the deaths of women in their eighth and ninth pregnancies; and 24 percent of the deaths of women in their tenth or a later pregnancy. This cause accounted for 18 percent of the deaths of women of unknown parity and 9 percent of the deaths of multiparae whose exact parity was not given.

Mortality rates (deaths per 10,000 live births) could not be calculated according to parity on account of the large number of women whose parity was unknown. However, as primiparae and the mothers of many children have, in general, higher maternal mortality rates than the mothers of two to six or seven children, the increased risk of death from puerperal albuminuria and convulsions among primiparae and among the mothers of 10 or more children is even greater than is shown by the differences in the percentages of the total deaths that are due to this cause. Some of the multiparae had had convulsions in previous pregnancies, but it was impossible to obtain accurate data on this point.

---

[4] Among the women whose deaths followed convulsions and were attributed to puerperal albuminuria and convulsions, the patient who had had an operative delivery tended to die sooner, 64 percent of those with operative delivery dying within the first day and 93 percent dying within the first week after the delivery. However, some women with toxemia died of sepsis or of hemorrhage, and those deaths are not included here.

Puerperal albuminuria and convulsions caused 41 percent of the deaths of primiparae of less than 20 years, 37 percent of the deaths of primiparae between 20 and 25 years old, and 29 percent of the deaths of primiparae of 25 years or older.

The proportion of the deaths of multiparae due to puerperal albuminuria and convulsions was about the same in the different age groups—19 or 20 percent—except in the age group 35 to 39 years, where it was 23 percent, and in the age group 40 to 44 years, where it was 28 percent.

PREVALENCE OF DEATHS FROM ALBUMINURIA AND CONVULSIONS AMONG WHITE AND COLORED AND AMONG URBAN AND RURAL MOTHERS

Both the percentage of the total deaths that were due to puerperal albuminuria and convulsions and the rates per 10,000 live births were higher among the colored than among the white mothers (table 86). This greater prevalence of deaths from puerperal albuminuria and convulsions among the colored women influences the total maternal mortality rates in the States having a considerable colored population, so that comparisons between the States can best be made with white and colored taken separately. The highest death rates from this cause among the white women were in Alabama and New

Table 86.—*Number and percentage of deaths and mortality rate among white and colored women dying from puerperal albuminuria and convulsions in all the States included in the study and in specified States having 2,000 or more colored births annually*

State	Women dying from puerperal albuminuria and convulsions								
	Total			White			Colored		
	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births
ALL STATES INCLUDED IN THE STUDY									
Total	1,900	26	16.1	1,493	25	14.1	407	31	33.8
STATES HAVING 2,000 OR MORE COLORED BIRTHS ANNUALLY									
Alabama	412	37	31.5	206	36	24.2	206	38	44.8
California	102	21	12.2	95	21	12.1	7	(1)	14.5
Kentucky	169	26	13.9	152	27	13.3	17	20	22.0
Maryland	85	22	13.2	63	23	12.3	22	20	16.7
Michigan	281	21	14.2	265	21	13.8	16	21	24.6
Oklahoma	83	28	19.3	73	29	18.0	10	20	39.5
Virginia	217	28	18.9	104	24	12.9	113	33	33.4

[1] Not shown because number of deaths was less than 50.

Hampshire; the lowest, in Wisconsin and Minnesota. Among the colored women in those States having 2,000 or more colored births annually, the highest rates from puerperal albuminuria were in Alabama and Oklahoma; the lowest,i n California and Maryland. It is rather striking that for every 10,000 live births only about one fourth as many white women in California as colored women in Alabama died of puerperal albuminuria and convulsions. The mortality rate from this cause for all white women included in the study was 14 per 10,000 live births, as compared with 34 for all colored women.

The mortality rate from albuminuria and convulsions was in general higher in the urban than in the rural areas (table 87).

There was, in general, a higher rate from puerperal albuminuria and convulsions in those States in which fewer of the mothers who died had had good prenatal care. (See Maternal Care, p. 54.)

Table 87.—*Number and percentage of deaths and mortality rate among women dying from puerperal albuminuria and convulsions in urban and rural areas of each State included in the study*

State	Total			In urban areas			In rural areas		
	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births
Total	1,900	26	16.1	777	22	16.8	1,123	29	15.7
Alabama	412	37	31.5	90	31	39.4	322	39	29.8
California	102	21	12.2	54	18	11.1	48	25	13.7
Kentucky	169	26	13.9	36	24	15.7	133	27	13.4
Maryland	85	22	13.2	52	20	14.3	33	26	11.9
Michigan	281	21	14.2	181	20	15.1	100	26	12.9
Minnesota	120	24	11.9	55	24	14.4	65	24	10.5
Nebraska	68	21	12.2	25	20	18.3	43	21	10.2
New Hampshire	37	34	21.2	14	26	15.4	23	42	27.4
North Dakota	41	26	13.8	11	(1)	27.8	30	23	11.7
Oklahoma	83	28	19.3	29	31	34.6	54	26	15.6
Oregon	41	23	14.3	18	22	15.4	23	24	13.6
Rhode Island	42	25	15.7	39	25	16.9	3	(1)	8.1
Virginia	217	28	18.9	76	28	30.2	141	29	15.8
Washington	69	22	14.8	34	19	14.0	35	26	15.8
Wisconsin	133	22	11.6	63	20	12.0	70	23	11.2

[1] Not shown because number of deaths was less than 50.

PERNICIOUS VOMITING

Pernicious vomiting of pregnancy was the primary cause of death given for only 61 of the 7,380 women included in the study. It was a contributing factor, however, in 191 other cases, of which 130 having albuminuria and convulsions as the primary cause are included in the group already discussed under that heading. The total number of cases in which death was associated with pernicious vomiting was thus 252. As was explained on page 139, in the assignment of joint causes every other puerperal cause takes precedence over "other accidents of pregnancy", which includes pernicious vomiting.

The primary causes of death of these 252 women are shown in table 88.

Table 88.—*Primary cause of death of women whose deaths were associated with pernicious vomiting of pregnancy*

Primary cause of death	Women whose deaths were associated with pernicious vomiting of pregnancy		
	Total	As a primary cause	As a contributing factor
All causes	252	61	191
Accidents of pregnancy	86	61	25
Puerperal hemorrhage	1	-----------	1
Other accidents of labor	4	-----------	4
Puerperal septicemia	26	-----------	26
Puerperal phlegmasia alba dolens, embolus, sudden death	5	-----------	5
Puerperal albuminuria and convulsions	130	-----------	130

No pathologic distinction can be made between the 130 cases associated with pernicious vomiting that were attributed to puerperal albuminuria and convulsions as a primary cause of death and the 61 that were attributed to pernicious vomiting as a primary cause. The diagnosis as between these two causes of death was largely a question of nomenclature. As either grouping seemed to accord with the international classification, the cause as given by the attending physician was followed in the tabulations.[5]

Nearly all the women whose deaths were associated with pernicious vomiting died before the seventh month, and most of them died before the fifth month (table 89).

Table 89.—*Period of gestation of women whose deaths were associated with pernicious vomiting of pregnancy*

Period of gestation	Women whose deaths were associated with pernicious vomiting of pregnancy		
	Total	As a primary cause	As a contributing factor
Total	**252**	**61**	**191**
First two trimesters	*221*	*56*	*165*
Less than 3 months	30	8	22
3 months	81	31	50
4 months	69	15	54
5 months	17	1	16
6 months	18	1	17
Month not reported	6	-----------	6
Last trimeter	*31*	*5*	*26*

The duration of the pernicious vomiting before the physician was called was given for 164 of the 252 deaths associated with pernicious vomiting. The vomiting was of less than 1 week's duration in 49 cases (but 19 of these women were said to have been already in poor condition when first seen); of 1 to 2 weeks' duration in 24 cases, with

---

[5] According the 1929 revision 221 of these deaths—86 from accidents of pregnancy; 5 from phlegmasia alba dolens, embolus, sudden death; and 130 from puerperal albuminuria and convulsions—would probably be assigned to other toxemias of pregnancy (no. 147).

13 in poor condition; of 2 to 4 weeks' duration in 28 cases, with 13 in poor condition; and of 4 weeks' duration or longer in 63 cases, with 48 in poor condition when first seen.

The condition that 227 of these 252 women were in when they were first seen by the physician was noted. Twenty-nine women were said to have been in good condition, 62 in fair condition, and 136 in poor condition.

Pregnancy was interrupted artificially for 121 women, or 48 percent of the 250 women for whom pernicious vomiting was either a primary cause of death or a contributing factor and concerning whom there was a report on onset of labor. Labor or abortion set in spontaneously in 47 cases (19 percent), and 82 women (33 percent) died without labor or abortion.

Operation was known to have been refused by 19 of the 127 women dying without operation whose deaths were associated with pernicious vomiting either as a primary cause or as a contributing factor. No report as to refusal was obtained for 59. A few of these women, as well as some who did not refuse operation, had spontaneous abortions. There were other cases in which the patients refused interruption of pregnancy for varying lengths of time and finally consented to operations when they were in very poor condition.

Of the 112 women who had therapeutic abortions 16 died of sepsis.

In addition to the group of 252 women already discussed, there were 140 women for whom pernicious vomiting was listed as a complication of pregnancy but whose deaths were not actually associated with the condition. For some of these the toxemia soon revealed itself to be of a convulsive type, but for many of them the condition had improved or the vomiting had ceased before the onset of the complication that caused death.

COMMENT BY ADVISORY COMMITTEE

The chief method of attack against the severe toxemias of pregnancy is conceded to be their early detection and control. For this it is necessary to have continuous intelligent medical supervision of the prospective mother from early in pregnancy, early recognition of untoward symptoms, prompt and judicious treatment of symptoms as they appear during pregnancy as well as during and after actual delivery of the patient, and the cooperation of the patient. It is true that a few patients developed toxemias and died who apparently had all these safeguards. A small number of these seemed to be true cases of fulminating eclampsia—fatal convulsions developing a few days after a thorough examination at which nothing abnormal was found. Evidently, in the present state of medical knowledge, death from toxemia cannot be entirely prevented. But the vast majority of toxemic deaths were of women who lacked some or all of the safeguards mentioned.

For many of the toxic deaths studied the physician was not responsible because he saw the patient for the first time when the condition was already acute or because the patient failed to follow his advice. Three fifths of the women were in convulsions or coma or otherwise in poor condition when the physician saw them for the first time. Moreover, some of the women were seen early in pregnancy and advised concerning prenatal care—but the advice was not accepted. Others were seen in the preeclamptic stage and induction of labor was advised—and the advice was not accepted. Evidently there is great need for the education of patients and families.

On the other hand, the study reveals serious conditions for which the physicians were responsible. Even though the occurrence of toxemia cannot be entirely prevented, many of the deaths from this cause can and should be prevented by the early recognition of symptoms and prompt and judicious treatment by the physician in charge. Some of the women (12 percent) had had what could be considered as good prenatal care, and the symptoms of approaching toxemia were promptly recognized during the latter part of gestation, but treatment was at fault. Induction of labor (as distinguished from accouchement forcé) was done in surprisingly few of these cases. Prenatal care, so far as the toxemias of pregnancy are concerned, will not save lives unless good clinical judgment and treatment are used.

The number of women who died during the first convulsion was rather surprising. Probably many more women die in this way than is realized.

Probably it is now generally conceded that radical treatment in eclampsia is never indicated except in the best environment and with proper anesthetic. The dire results of teaching radical treatment for eclampsia were manifest—almost universal resort to immediate operative interference in all kinds of cases and by all kinds of practitioners. Cesarean section seemed to be too often regarded as proper treatment for eclampsia. Oftentimes the sections were done without regard to the profound shock from which many of the patients were suffering and without due consideration for the proper anesthetic. Operative interference of all sorts was frequent, even in the cases of multiparous women; a majority of the operations were done under general anesthesia, ether being used commonly and even chloroform occasionally. Epigastric pain, which is a prodromal symptom of eclampsia, was occasionally observed, and was almost always treated as acute indigestion. There were more than occasional instances in which rising blood pressure was noted, but its importance evidently was not realized. In many cases treatment other than vague advice as to diet, or the prescription of a diuretic, was far from prompt. In other cases (202) the treatment was an immediate accouchement forcé, which, though prompt, would be called judicious by no leader in obstetric thought today.

Few of these women were treated along the conservative lines now accepted—with fluids, glucose, magnesium sulphate, and morphine or other sedative and induction of labor. There can be no question that failure to institute prompt treatment and the injudicious treatment they did receive contributed to many of the deaths. It is evident, therefore, that some safe, conservative treatment for eclampsia should be agreed upon and that knowledge of it should be widely disseminated.

PUERPERAL HEMORRHAGE

Puerperal hemorrhage (no. 144 in the international classification),[1] which was shown by interview to be the cause of death third in importance in the study, accounted for 791 deaths, or 11 percent of the total. This includes 347 deaths attributed to placenta previa (no. 144a) and 444 deaths attributed to other puerperal hemorrhage (no. 144b); the latter figure includes 374 deaths from postpartum hemorrhage and 70 from premature separation of placenta, "adherent placenta", and other similar causes, as well as undefined puerperal hemorrhage. There were also 61 women with placenta previa, 38 with premature separation of the placenta, and 519 with postpartum hemorrhage (these figures include some duplications) whose deaths were attributed primarily to other causes, such as puerperal sepsis.

In the Manual of Joint Causes of Death placenta previa takes precedence over all puerperal causes except ectopic gestation and puerperal septicemia, and other puerperal hemorrhage takes precedence over all puerperal causes except abortion, ectopic gestation, certain "other" accidents of pregnancy, ruptured uterus, and puerperal septicemia. It should be noted that deaths following abortion with hemorrhage are classified as due to abortion rather than to postpartum hemorrhage.

Of the 758 deaths assigned to puerperal hemorrhage by the Bureau of the Census according to information on the death certificates, 703 were so attributed in this study after interview with the attendant; 37 of the other 55 were found to be actually due to abortion or to puerperal sepsis, 2 were nonpuerperal, and the rest were due to other causes. However, 88 deaths not originally assigned to puerperal hemorrhage were attributed to this cause and added to the 703 on account of information obtained in the interview; 41 of them had previously been assigned to "other accidents of labor." (See General Considerations, table 2, p. 10.)

PARITY AND AGE

Puerperal hemorrhage was definitely related to both parity and age. It caused 7 percent of all deaths among primiparae as compared with *13 percent among multiparae.* The percentage for multiparae was higher than the percentage for primiparae in every age group under 40. The number of primiparae 40 and over were too few for comparison. Among both primiparae and multiparae the percentage tended to increase with age, the figures ranging among the primiparae from 5 percent for those under 20 years of age to 15 percent for those from 35 to 39 and among the multiparae, from 8 percent for those under 20 to 18 percent for those 40 and over (table 90).

---

[1] This title was not changed in the 1929 revision of the International List of Causes of Deaths.

TABLE 90.—*Number of deaths from all puerperal causes and number and percentage of deaths from puerperal hemorrhage in each age period among primiparae and multiparae dying from puerperal causes*

Age period	Women dying from puerperal causes											
	Total			Primiparae			Multiparae			Parity not reported		
	Total	Puerperal hemorrhage		Total	Puerperal hemorrhage		Total	Puerperal hemorrhage		Total	Puerperal hemorrhage	
		Number	Percent		Number	Percent[1]		Number	Percent		Number	Percent[1]
Total	7,380	791	11	2,334	153	7	4,520	608	13	526	30	6
Under 20 years	880	46	5	741	35	5	118	10	8	21	1	------
20 years, under 25	1,545	120	8	802	52	6	628	60	10	115	8	7
25 years, under 30	1,537	139	9	409	32	8	995	101	10	133	6	5
30 years, under 35	1,412	178	13	218	15	7	1,084	154	14	110	9	8
35 years, under 40	1,312	196	15	114	17	15	1,092	173	16	106	6	6
40 years, under 45	570	93	16	33	------	------	507	93	18	30	------	------
45 years and over	94	16	17	4	1	------	85	15	18	5	------	------
Not reported	30	3	------	13	1	------	11	2	------	6	------	------

[1] Not shown where number of women was less than 50.

The percentage of deaths from puerperal hemorrhage rose rapidly from 7 for primiparae to 10 for women in their second pregnancy and to 13 for women in their third pregnancy. It remained at 13 percent and 14 percent for women in the fourth to sixth pregnancy, then went to 17 percent for the seventh pregnancy, 22 percent for the eighth pregnancy, and 24 percent for the ninth pregnancy. It caused 21 percent of the deaths of the women with 10 or more pregnancies. Six percent of the deaths of those of unknown parity and 8 percent of the deaths of multiparae the exact number of whose pregnancies was unknown were due to puerperal hemorrhage. In fact, puerperal hemorrhage was second only to puerperal sepsis as a cause of death among women with eight or more pregnancies, as it caused 22 percent of the deaths in this group, while puerperal sepsis caused 32 percent and puerperal albuminuria and convulsions 21 percent.

As has been stated, maternal mortality rates by parity could not be accurately calculated in this study because of the large number of women concerning whom exact information on number of pregnancies could not be obtained, and because the data on parity obtained by interviews for this study are apparently not strictly comparable with those given in the tables on order of birth in the census reports. (See General Considerations, p. 34.) However, there is evidence that the general maternal mortality rate is higher for primiparae and for the mothers of more than 7 or 8 children.[2] Therefore the mortality rate from puerperal hemorrhage is probably not so much lower for first than for second births as the differences in percentage might suggest. After the seventh or eighth pregnancy, on the other hand, the risk of death from puerperal hemorrhage is probably even greater than the increased percentages of deaths due to this cause would imply.

---

[2] Woodbury, Robert Morse: Maternal Mortality, pp. 34–35. U.S. Children's Bureau Publication No. 158. Washington, 1926.

PUERPERAL HEMORRHAGE AMONG URBAN AND RURAL AND WHITE AND COLORED WOMEN, BY STATES

Puerperal hemorrhage caused a slightly larger proportion of maternal deaths in rural areas (12 percent) than in urban areas (10 percent) (table 91). The mortality rate from puerperal hemorrhage was slightly higher in urban than in rural areas for both white and colored women, but the differences are not sufficient to be statistically significant.

TABLE 91.—*Number and percentage of deaths and mortality rate among white and colored women dying in urban and rural areas from puerperal hemorrhage*

Deaths from puerperal hemorrhage, and color	Women dying from puerperal hemorrhage								
	Total			In urban areas			In rural areas		
	Number	Percent of total maternal deaths	Maternal mortality rate [1]	Number	Percent of total maternal deaths	Maternal mortality rate [1]	Number	Percent of total maternal deaths	Maternal mortality rate [1]
Total	**791**	**11**	**6.7**	**331**	**10**	**7.2**	**460**	**12**	**6.4**
Placenta previa	347	5	2.9	147	4	3.2	200	5	2.8
Other puerperal hemorrhage	444	6	3.8	184	5	4.0	260	7	3 6
White	*670*	*11*	*6.3*	*290*	*10*	*6.9*	*380*	*12*	*6.0*
Placenta previa	293	5	2.8	130	4	3.1	163	5	2.6
Other puerperal hemorrhage	377	6	3.6	160	5	3.8	217	7	3.4
Colored	*121*	*9*	*10.0*	*41*	*8*	*10.8*	*80*	*10*	*9.7*
Placenta previa	54	4	4.5	17	3	4.5	37	5	4.5
Other puerperal hemorrhage	67	5	5.6	24	5	6.3	43	5	5.2

[1] Deaths per 10,000 live births.

Puerperal hemorrhage caused a larger proportion of maternal deaths among the white women (11 percent) than among the colored (9 percent), but the mortality *rate* (deaths per 10,000 live births) from puerperal hemorrhage was higher for the colored women than for the white (table 92).

The mortality rate from puerperal hemorrhage ranged from 4.4 per 10,000 live births in North Dakota to 8.6 per 10,000 live births in Rhode Island (table 93). There was more variation in the rates among the colored women than among the white. In those States having 2,000 or more colored births annually the rates varied from 4.0 in Oklahoma to 12.4 in California for the colored group, and from 5.1 in Kentucky to 7.1 in Alabama and 7.2 in Oklahoma for the white group.

TABLE 92.—*Number and percentage of deaths and mortality rate among white and colored women dying from puerperal hemorrhage in all the States included in the study and in specified States having 2,000 or more colored births annually*

State	Women dying from puerperal hemorrhage								
	Total			White			Colored		
	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births
ALL STATES INCLUDED IN THE STUDY									
Total	791	11	6.7	670	11	6.3	121	9	10.0
STATES HAVING 2,000 OR MORE COLORED BIRTHS ANNUALLY									
Alabama	109	10	8.3	60	10	7.1	49	9	10.7
California	50	10	6.0	44	10	5.6	6	(1)	12.4
Kentucky	62	10	5.1	58	10	5.1	4	5	5.2
Maryland	49	13	7.6	35	13	6.8	14	13	10.7
Michigan	137	10	6.9	132	11	6.9	5	6	7.7
Oklahoma	30	10	7.0	29	12	7.2	1	2	4.0
Virginia	81	11	7.1	50	12	6.2	31	9	9.2

[1] Not shown because number of deaths was less than 50.

TABLE 93.—*Number and percentage of deaths and mortality rate among women dying from puerperal hemorrhage in urban and rural areas of each State included in the study*

State	Women dying from puerperal hemorrhage								
	Total			In urban areas			In rural areas		
	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births
Total	791	11	6.7	331	10	7.2	460	12	6.4
Alabama	109	10	8.3	24	8	10.5	85	10	7.9
California	50	10	6.0	23	8	4.7	27	14	7.7
Kentucky	62	10	5.1	7	5	3.1	55	11	5.6
Maryland	49	13	7.6	30	12	8.2	19	15	6.8
Michigan	137	10	6.9	96	10	8.0	41	11	5.3
Minnesota	52	11	5.2	19	8	5.0	33	12	5.3
Nebraska	35	11	6.3	14	11	10.3	21	10	5.0
New Hampshire	8	7	4.6	4	7	4.4	4	7	4.8
North Dakota	13	8	4.4	1	(1)	2.5	12	9	4.7
Oklahoma	30	10	7.0	7	8	8.3	23	11	6.6
Oregon	24	14	8.4	8	10	6.8	16	17	9.4
Rhode Island	23	14	8.6	20	13	8.7	3	(1)	8.1
Virginia	81	11	7.1	17	6	6.7	64	13	7.2
Washington	28	9	6.0	22	12	9.0	6	5	2.7
Wisconsin	90	15	7.8	39	12	7.4	51	17	8.2

[1] Not shown because number of deaths was less than 50.

PLACENTA PREVIA

For 347 of the 408 women who were known to have had placenta previa, it was given as a primary cause of death. Fifty-three of the 408 women died from puerperal sepsis and 8 from other causes. Some other women concerning whom little or no information could be secured were known to have died of hemorrhage, and probably some of them had placenta previa.

The only indication of its presence that placenta previa gives is painless bleeding. Of these 408 women, 327 had some bleeding before the onset of labor, 38 had no bleeding then, and for 43 there was no information on this point. In 310 cases of bleeding before the onset of labor for which the extent of bleeding was ascertained, it was scanty in 44 cases, moderate in 82 cases, and profuse in 184 cases. The week in which the bleeding began was reported for 288 of the 327 cases of bleeding during pregnancy. It began before the thirteenth week in 7 cases; from the thirteenth to the twenty-fifth week, inclusive, in 31 cases; from the twenty-sixth to the thirty-ninth week, inclusive, in 201 cases; and in the fortieth week in 49 cases.

Of the 408 women who had placenta previa there were 107 whose first hemorrhage—occurring in some cases before the onset of labor and in others at the beginning of labor—was dangerously profuse, and thus there had been apparently no warning of the existence of placenta previa. *In 236 cases, however, there had been a warning hemorrhage earlier in pregnancy;* in 65 cases there was no report on this. The warning hemorrhage resulted in prompt treatment for the placenta previa in 18 cases, but *in 216 cases treatment was delayed;* in 2 cases in which there was warning hemorrhage there was no report on the promptness of treatment. Of the 104 cases of hemorrhage without warning for which the promptness of treatment was reported, 87 had prompt treatment and 14 had delayed treatment; 3 women died at once without time for treatment. Nine of those for whom there was no report as to warning bleeding were known, nevertheless, to have had treatment delayed. In all, 239 women were reported to have had delayed treatment. The delay was apparently due to the physician in 129 cases and due to the patient, her family, or circumstances such as inaccessibility or difficulty in reaching a physician, in 110 cases. In 61 instances there was no report as to the promptness of treatment (table 94).

TABLE 94.—*Warning bleeding and treatment of placenta previa among women whose deaths were associated with placenta previa*

Treatment	Women whose deaths were associated with placenta previa						
	Total		Warning bleeding				
			Yes		No		Not reported
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	
Total	408		236		107		65
Report on treatment	**347**	**100**	**234**	**100**	**104**	**100**	**9**
Prompt	105	30	18	8	87	84	
Delayed	239	69	216	92	14	13	9
By physician	*129*	*37*	*123*	*53*	*4*	*4*	*2*
Otherwise	*110*	*32*	*93*	*40*	*10*	*10*	*7*
No time for treatment	3	1			3	3	
No report on treatment	**61**		**2**		**3**		**56**

At least 9 women with placenta previa died without medical attention, and 46 were moribund when the physician arrived; in 351 cases there was earlier medical care; in 2 cases the care was not reported.

Of the 408 women who died following placenta previa, a report concerning operations for delivery was obtained for all but 7. Three hundred and twenty-five (81 percent) were known to have had some operation aimed at delivery (table 95).

TABLE 95.—*Type of principal operation for delivery performed on women whose deaths were associated with placenta previa*

Type of principal operation for delivery	Women whose deaths were associated with placenta previa	
	Number	Percent distribution
Total	408	
Report on operation	**401**	**100**
Version	207	52
With dilatation of cervix	*124*	*31*
Cesarean section	41	10
Forceps (without version)	33	8
With dilatation of cervix	*18*	*4*
Dilatation of cervix only	17	4
Other operation	24	6
Type not reported	3	1
No operation	76	19
No report on operation	7	

About half (207) of the women who died following placenta previa were reported to have been delivered by some form of version, in 124 cases preceded by artificial dilatation of the cervix. This was nearly always a version with immediate extraction. In only 2 of these 207 cases of delivery by version or version combination was there said to have been a Braxton Hicks version without immediate extraction.

Cesarean section was the method of delivery used in the cases of 41 women (10 percent), at least 7 of whom had been packed before admission to the hospital. A forceps operation alone or in combination with some operation other than version was used in 33 cases (8 percent), and dilatation of the cervix—usually manual or bag dilatation—was the only operation for delivery in 17 cases (4 percent). Only 27 of the 408 women are known to have had a blood transfusion.

The uterus was reported packed postpartum in 31 cases. This had apparently been done as a routine procedure in only 6 cases; in the other 25 cases the packing was done after the onset of a postpartum hemorrhage.

Ruptured uterus was diagnosed by the attending physician after treatment in 3 cases of death associated with placenta previa, and in 18 other cases the histories strongly suggested rupture of the uterus.

The cervix was known to have been torn in 17 cases. There were undoubtedly more cervical tears, as inspection of the cervix was not frequent.

There was a report on postpartum hemorrhage in the cases of 335 women whose deaths were associated with placenta previa and who had been delivered in the third trimester. Of these women 156 had a postpartum hemorrhage and 179 did not. Of the 347 women with placenta previa as a primary cause of death, 84 had other puerperal hemorrhage as a principal contributory cause of death.

Of the 347 women whose deaths were attributed to placenta previa (no. 144a) 50 died undelivered, and the rest died soon after delivery. The interval between delivery and death was reported for 290 women, of whom 88 percent died less than a day after delivery and 97 percent died within the first week.

OTHER PUERPERAL HEMORRHAGE

The deaths of 444 women were attributed to puerperal hemorrhage other than placenta previa. This title (no. 144b) includes conditions such as postpartum hemorrhage, adherent placenta, premature separation of the placenta, and bleeding during or after labor the exact cause of which is unknown. All but 1 of these 444 deaths occurred after the women had reached the last trimester; the period of gestation in that 1 case was not recorded. In 215 additional cases other puerperal hemorrhage (no. 144b) was given as the principal contributory cause of death.

Of the 443 women whose deaths after reaching the last trimester were attributed to other puerperal hemorrhage information as to the termination of labor was given for all but 10. Termination was spontaneous in 249 cases and artificial in 178 cases; the patient was undelivered in 6 cases.

The principal operations for delivery that were performed on these women are shown in table 96. Fifteen percent of all those for whom there was a report on operation had had manual removal of the placenta.

TABLE 96.—*Type of principal operation for delivery performed on women dying from puerperal hemorrhage exclusive of placenta previa*

Type of principal operation for delivery	Women dying from puerperal hemorrhage exclusive of placenta previa	
	Number	Percent distribution
Total	444	
Report on operation	**435**	**100**
Operation	*220*	*51*
Cesarean alone or following other operation	16	4
Forceps (without version)	81	19
With manual removal of placenta	(9)	(2)
Version	63	14
With manual removal of placenta	(14)	(3)
Manual removal of placenta (following spontaneous delivery)	34	8
Manual removal with operation other than forceps or version	7	2
Other operation	19	4
No operation	*215*	*49*
No report on operation	**9**	

There was a report as to the use of pituitrin in 346 cases in which a physician had been the attendant at confinement. In 87 cases (25 percent) no pituitrin had been used; in 22 cases (6 percent) it had been used in the first, and in 75 cases (22 percent) in the second stage of labor; in 162 cases (47 percent) it had been used only in the third stage of labor or postpartum.

Of these 443 women who died after reaching the last trimester and whose deaths were attributed to other puerperal hemorrhage, 30 were reported to have had cervical lacerations. This is doubtless a great understatement, for in many cases, probably the majority, there was no inspection of the cervix for laceration.

Like the women whose cause of death was placenta previa, women dying from other puerperal hemorrhage died soon after delivery. Of 429 women who were delivered and for whom the interval between delivery and death was given, 88 percent died within the first day and 95 percent died within the first week.

There was a report on medical attention for 440 of the 444 women who died of other puerperal hemorrhage. Twenty-nine (7 percent) of these women had had no medical attention whatever, 48 (11 percent) had not been seen by a physician until they were dying; 363 (83 percent) had had some earlier medical attention.

POSTPARTUM HEMORRHAGE

Postpartum hemorrhage was apparently the condition chiefly responsible for 374 of the 444 deaths attributed to other puerperal hemorrhage (no. 144b). In addition to the 374 deaths of which postpartum hemorrhage was the primary cause, it was present as a complication in the deaths of 519 other women, so that 893 women, or 21 percent of the 4,188 who died after reaching the last trimester of pregnancy and for whom a report was made on this condition, had postpartum hemorrhage. Of the 374 women dying of postpartum hemorrhage, 50 had no physician at the time of delivery; in 185 cases the physician did not leave the patient until after her death, and in 94 cases the patient's condition was satisfactory when he left; in 28 cases she was in unsatisfactory condition; and in 17 cases a statement as to her condition or as to attendant was not made.

The length of time the physician remained after delivery was reported in 104 of the 122 cases in which he left before the patient's death; in 20 of these cases he left before an hour had elapsed after the delivery; in 47 cases he remained from 1 to 2 hours; in 19 cases he remained from 2 to 3 hours; and in 18 cases he stayed 3 hours or longer.

The placenta was said to have been inspected in 259 instances of death from postpartum hemorrhage but not inspected in 65. For 50 cases no report on inspection was obtained. The management of the third stage was usually described as "modified Credé"; but as the description given was seldom definite, tabulations on this point were not made.

Of the 893 women who had a postpartum hemorrhage before death (including those whose deaths were attributed to other causes) only 78 were known to have had a blood transfusion.

PREMATURE SEPARATION OF THE PLACENTA

The diagnosis of premature separation of the placenta was made by the attending physician in 106 of the deaths. The primary cause of death for 68 of these was other puerperal hemorrhage (no. 144b); for 12, puerperal sepsis (no. 146); and for the remainder, other causes. There were other deaths from unexplained hemorrhage that in all probability were caused by this condition, but information sufficient for a positive diagnosis was not obtained.

Abdominal pain was definitely mentioned as a symptom of the condition but 19 times in the 106 cases, was absent in 11 cases, and was not reported upon in 76. The lack of information with regard to pain in so many cases is probably due to the fact that the specific question was not asked at the time of the interview.

Trauma was supposed to have been associated with the condition in 9 cases, it was not a factor in 30, and there was no report in 67.

Toxemia was associated with the condition in 23 cases and not associated in 39 cases; there was no report in 44.

Transfusions are known to have been given to 13 women and infusions to 21.

Delivery was by manual dilatation, usually with version or forceps, in 31 cases. In addition, there were 12 other forceps deliveries and 12 versions, and 17 Cesarean sections. In 8 cases there was some other method of operative delivery. In 21 cases delivery was spontaneous. In 3 cases the patient died undelivered, and in 2 cases the exact method of delivery was not reported.

The premature separation occurred at term in 57 cases and in the last trimester in all but 13 cases.

High fetal mortality was to be expected. Only 13 babies were born alive.

The uterus was known to have been packed after delivery in only 9 cases.

The women whose deaths were associated with premature separation of the placenta were, in general, older and had had more pregnancies than the total group included in the study. Sixty-five percent of the former and 46 percent of the latter were 30 years of age or older. Eighteen percent of the women whose deaths were associated with premature separation and 34 percent of the total group with parity reported were primiparae. Sixty-nine percent of the women whose deaths were associated with premature separation and for whom the number of pregnancies was reported, compared with 49 percent of all the women in the study with number reported, had had three or more pregnancies.

COMMENT BY ADVISORY COMMITTEE

If the onset of hemorrhage in placenta previa were accompanied by pain, patients would apply for treatment sooner and would not be content with inactivity on the part of the physician. Of 234 cases in which warning bleeding occurred, it was ignored by the patient or by the physician in 216, and in more than half these cases it was the physician who was responsible for the delay. Even among the 107 cases in which the first hemorrhage was profuse, and it could therefore be said that no warning was given, there were a few cases of delayed treatment, for a small number of which the physician was responsible. Placenta previa is not a condition that can safely be treated expectantly. Here is an example:

> The patient was admitted to a hospital at term after having bled off and on for 2 months without pain and having had a very profuse hemorrhage a month before admission. She was in labor when admitted and was flowing and passing clots. Placenta previa was diagnosed by vaginal examination. A profuse hemorrhage occurred 9 hours after admission. Treatment: Ice cap to abdomen, elevation of the foot of the bed, and ergot. She was flowing freely 22 hours after admission. The ice cap was refilled, and one-sixth of a grain of morphine was given. Twenty-seven hours after admission she was still bleeding. Thirty-two hours after admission, still bleeding and showing signs of shock, she was delivered by version and extraction. The child was stillborn. The mother was then given stimulation and 1,000 cc normal saline solution, but died 5 hours after delivery.

This case was mismanaged in several ways. Active treatment was delayed, although the patient had been bleeding for 2 months; a vaginal examination of a bleeding patient was made without preparing her for delivery; expectant treatment was continued when active treatment to control the bleeding should have been instituted; no preparation for blood transfusion was made, although the patient had been in the hospital for 32 hours before the delivery.

A Braxton Hicks version, which is of greatest use to control bleeding, was rarely done, but manual dilatation of the cervix and internal podalic version with immediate extraction were done many times, regardless of the woman's condition. The frequent occurrence of rupture of the uterus, tears, hemorrhage, shock, and death immediately after delivery illustrates the seriousness of these procedures and the fact that they are not proper in the treatment of placenta previa. So many of these women died immediately after delivery that relatively few lived long enough to die of sepsis; as it was, 53 died of sepsis.

Treatment for shock in connection with hemorrhage was rarely mentioned in the histories as given in the schedules. Fluids of any sort were infrequently used. That the buttocks of the child could be used to control hemorrhage and that shock could be treated at this time, the labor being terminated by the patient's own efforts, was apparently seldom thought of.

Many women with placenta previa died of hemorrhage after labor. Only 31 of the women were packed after delivery. This would suggest that if proper packing were at hand it would be used more often, and certainly blankets and sheets would not be used as emergency packing, with later death from sepsis.

Unfortunately rupture of the membranes was seldom done in the appropriate cases of lateral placenta previa.

Long distances and bad roads would seem to have contributed to some of the deaths from placenta previa.

It should be emphasized that Cesarean section is contra-indicated in the treatment of placenta previa when the patient is suffering from shock or hemorrhage or potential or actual sepsis. If dirty packing had been used or if there had been previous mismanagement of any sort, the delivery should be by vagina whenever possible. But in this study the Cesarean sections for placenta previa were not limited to cases in which the mother and baby were in good condition. The operation was often done after great loss of blood and without coincident blood transfusion, though transfusion would doubtless have been given more frequently if equipment for blood typing and for giving the transfusion had been at hand. The Cesarean was sometimes performed after dirty packing had been done before the women were admitted to the hospital. Naturally many women who did not die at once from shock and hemorrhage died from sepsis. The following is an extreme case:

A woman who had had eight normal deliveries, at about term, bled for 3 or 4 days and was packed several times by several physicians. A small blanket, not sterile, was used in one instance. She was sent by ambulance 30 miles to a hospital, where a Cesarean section was done. She died 5½ days later from sepsis.

The treatment of placenta previa is to control bleeding and treat shock and acute anemia; it is not to effect the immediate delivery of the fetus except as a means to this end and only in properly selected cases.

In the cases diagnosed as placental separation also, shock, even when severe, did not seem to be sufficiently considered in determining treatment. Only one fifth of the women in this group had spontaneous deliveries. About half of the women in the group were delivered immediately. The following histories show some of the more extreme cases:

In a case in which the diagnosis was placental separation the cervix was dilated manually after a short labor and a 6-month fetus was delivered with high forceps.

At a university teaching hospital a classical Cesarean was done after a 30-hour labor for premature separation. The woman died of sepsis.

The frequent use of pituitrin before delivery in cases of women who later died of puerperal hemorrhage other than placenta previa is worthy of comment.

OTHER ACCIDENTS OF LABOR, INCLUDING RUPTURE OF THE UTERUS

OTHER ACCIDENTS OF LABOR

To "other accidents of labor" (no. 145 of the international list) were attributed after interview 652 of the 7,380 deaths included in the study. On the basis of information on the death certificates 812 deaths had originally been so assigned. (See table 2, General Considerations, p. 10.) To Cesarean section (no. 145a) were attributed 136 of the 652 deaths, which have been discussed under Cesarean Section (p. 89). One hundred and nine deaths were attributed to instrumental delivery and other operative procedures (no. 145b). These were not deaths resulting from hemorrhage or sepsis or toxemia but were, in general, deaths thought by the attending physician to be due to shock, exhaustion, or embolism as a direct result of the labor or of the operative delivery. See last two paragraphs, p. 168.

The remaining 407 deaths were attributed to "others" under the title "other accidents of labor" (no. 145c). Sixty-five of these were attributed to no. 145c1, which includes deaths due to rupture of the uterus or bladder during delivery. The 63 that were due to ruptured uterus are discussed on page 167. Forty-six were attributed to no. 145c2, a group including deaths said to be due to difficult or abnormal labor, faulty presentation, inversion of the uterus (see p. 169), or similar terms. The immediate cause of death in these cases was usually thought to be shock or exhaustion. To others under this subtitle (no. 145c3) were attributed 296 deaths. This group contains those deaths about which so little was known that it was not possible to attribute them to a more definite cause. It includes also deaths in which influenza, pneumonia, and certain other diseases complicated an otherwise fairly normal childbirth.

This very miscellaneous group of cases may be listed as follows with the international-list numbers:[1]

145. Other accidents of labor	652
a. Cesarean section	136
b. Instrumental deliveries, etc	109
c. Others	407
1. Ruptured uterus (or bladder)	65
2. Difficult labor	46
3. Others	296

Of the 296 women whose deaths were attributed to no. 145c3, there was a report on intercurrent disease during pregnancy for 203, of whom 137 (67 percent) had had some intercurrent disease. This was a much larger proportion than for the entire number of women studied;

---

[1] In the 1929 revision of the International List of Causes of Death other accidents of labor (no. 145) becomes other accidents of childbirth (no. 149), consisting of Cesarean section (no. 149a), and others under this title (no. 149b). Rupture of uterus or bladder is now no. 149b1; the conditions formerly grouped under nos. 145b, 145c2, and 145c3 are now included in no. 149b2 and 149b3.

of the 7,380 women in the study there was a report on intercurrent disease for only 4,216, of whom 1,271 (30 percent) had had an intercurrent disease. Only one other group, in fact, included a large proportion of women with intercurrent disease; of the 353 women whose deaths were attributed to abortion (no. 143a) there was a report on intercurrent disease for 232, 66 percent of whom had had such disease during pregnancy.

Not only intercurrent disease during pregnancy but various complications after delivery contributed to some of these deaths. The nonpuerperal contributory causes of death are therefore of particular interest in these 296 cases attributed to no. 145c3. For 242 some nonpuerperal contributory cause was given. In 65 cases influenza (including influenzapneumonia) was given as a principal contributory cause of death.[2] Broncho-pneumonia was given as the principal contributory cause of death in 11 cases and pneumonia, either lobar or unspecified, in 62 cases. Other diseases of the respiratory system were given in five cases.

Some disease of the heart was given as the principal contributory cause in 55 cases, but this was in some cases "chronic myocarditis" the diagnosis of which had been based on evidence not at all clear.

Cerebral hemorrhage was the principal contributory cause in 12 cases, and some other disease of the nervous system or organs of special sense in 4 cases. Intestinal obstruction was given in 4 cases, some other disease of the digestive system in 10, anemia in 7, and other diseases in 7.

RUPTURE OF THE UTERUS

In addition to the 63 deaths attributed to ruptured uterus, a subdivision of other accidents of labor (no. 145, see p. 166), 28 had a diagnosis of ruptured uterus made by the attending physician or at autopsy—a total of 91 out of the 7,380 deaths included in the study. Of these 28 deaths, 17 were attributed to puerperal septicemia, 5 to puerperal hemorrhage, and 6 to accidents of pregnancy. (Deaths from rupture of the uterus "during pregnancy" as distinguished from "at labor" are assignable to accidents of pregnancy, no. 143).

Ten of these 91 women were primiparae and 77 were multiparae; the parity of 4 was not reported.

The number of hours that these women had been in labor is shown in table 97. Six of them—1 primipara and 5 multiparae—were not in labor. In the case of the primipara the rupture was apparently spontaneous at the site of aberrant uterine sinuses on the posterior wall of the uterus. Of the 5 multiparae who were not in labor 2 had had previous Cesarean sections; no adequate explanation for the rupture was given in the other 3 cases.

Fifteen of the multiparae had been in labor less than 6 hours; 17 between 6 and 12 hours; 10 between 12 and 18 hours; 10 between 18 and 36 hours; and 10, 36 hours or more. The number of hours in labor was not reported for 10 of the multiparae. In the cases of eight multiparae there was evidence that the patient had been delivered by Cesarean section in a previous pregnancy.

---

[2] Influenza was given as the principal nonpuerperal contributory cause of death in 256 of the 7,380 cases in the study. In addition to the 65 cases mentioned above, 71 deaths with influenza as the principal nonpuerperal contributory cause were attributed to abortion (no. 143a), 73 to puerperal septicemia (no. 146), 31 to puerperal albuminuria and convulsions (no. 148), and 16 to other causes.

TABLE 97.—*Parity and hours in labor for women who died following ruptured uterus*

Hours in labor	Women who died following ruptured uterus			
	Total	Primiparae	Multiparae	Parity not reported
Total	91	10	77	4
None	6	1	5	
Less than 6	15		15	
6, less than 12	19	1	17	1
12, less than 18	11	1	10	
18, less than 24	5		5	
24, less than 30	6	2	4	
30, less than 36	1		1	
36 or more	16	4	10	2
Not reported	12	1	10	1

The type of presentation was reported in 78 of the 91 cases; it was vertex in 59 cases, face in 6 cases, breech in 6 cases, and transverse in 7 cases.

There was a report as to the use of pituitrin in 75 cases. It was not used in 36 cases, and was used for induction in 1 case, in the first stage in 10 cases, in the second stage in 13 cases, in the third stage or postpartum only in 14 cases, and at an unreported stage in 1 case.

Of the 91 women, 64 had an operation for delivery and 27 did not; 15 of these 27 died undelivered and 12 were delivered spontaneously. As some of the operations were unsuccessful, 6 of the 64 who had operations for delivery died undelivered. The operations for delivery included 11 Cesarean sections (3 of them following attempts at other operations), 16 versions (4 of them following attempts at forceps operations, 1 following artificial dilatation of the cervix), 19 forceps operations in addition to the 4 followed by versions (1 following artificial dilatation of the cervix), 5 craniotomies or embryotomies, and 13 other operations. In a few of these cases the operation was done after rupture of the uterus had been at least tentatively diagnosed. Very definite information as to the time of diagnosis was not often obtained in the interview.

In addition to these 91 cases in which rupture of the uterus was diagnosed by attending physician or at autopsy, there were many others in which the symptoms suggested ruptured uterus, although the attending physician had not made that diagnosis. Note was made of such cases when the schedules were edited, and those schedules were studied carefully by a member of the committee. His opinion was that the history pointed clearly to ruptured uterus in 68 cases and made such a diagnosis probable in 109 other cases. There were other women who may have had ruptured uterus, but information sufficient for its diagnosis was not obtained. It is probable, therefore, that 177 women had ruptured uterus in addition to the 91 for whom it was diagnosed by the attending physician or at autopsy.

The causes of death to which these 177 cases were attributed on interview were: Puerperal hemorrhage, 63; other accidents of labor, 70 (including 52 attributed to instrumental delivery and operations other than Cesarean, and 18 attributed to others under this title); puerperal septicemia, 10; puerperal phlegmasia alba dolens, embolus, sudden death, 8; puerperal albuminuria and convulsions, 26.

Seventy-three of these women were primiparae and 103 were multiparae; the parity of 1 was not reported. One hundred and sixty-two (all but 15) had had operations for delivery—version in 72 cases (in 25 following artificial dilatation of the cervix), forceps in 62 cases in addition to the 20 with version (in 13 following artificial dilatation of the cervix), and other operations in 28 cases. In 160 cases there was a report as to the use of pituitrin; it had not been used in 40 cases, had been used in the first or the second stage of labor in 73 cases, in the third stage or postpartum only in 46 cases, and at an unreported stage in 1 case. There had been vertex presentation in 139 cases, face in 4 cases, breech in 9 cases, transverse in 19 cases, and vertex and transverse (twins) in 1 case; in 5 cases the type of presentation was not reported.

The following are cases of death from undiagnosed but probable rupture of the uterus:

A woman, aged 30, was in labor for the first time. She had had no prenatal care. After 6 hours of labor described as "difficult with no progress", a high forceps operation was done, which was said to have been "rather difficult." The baby was born alive and weighed 10 pounds. Two hours after delivery the patient began to bleed. She died 14 hours after delivery.

A primiparous woman, aged 24, had vertex presentation with the occ ipu posterior. After 8 or 9 hours of first-stage labor the pains had become short and jerky. Dilatation of the cervix was not complete. Four minims of pituitrin was given with no apparent effect. One hour later another similar dose was given. A consultant was sent for who applied forceps. The woman had been in labor about 12 hours, and the cervical dilatation was about four fingers. The delivery was exceedingly difficult, both physicians pulling alternately for 35 or 40 minutes. There was complete perineal laceration and immediately after the delivery of the baby a brief but severe hemorrhage. Although the hemorrhage soon stopped, the patient went into shock and died shortly afterward. She was not examined for cervical tears or uterine rupture.

INVERSION OF THE UTERUS

Twenty cases of inversion of the uterus were reported. In three cases the condition was not discovered until necropsy was done. These cases are probably not a true index of the frequency of the complication. There were many unexplainable deaths that occurred in severe shock, some of which may have been due to inversion of the uterus.

The causes of death were given as postpartum hemorrhage and other hemorrhage at labor, in 13 cases; accidents of labor, in 5 cases; puerperal septicemia, in 1 case; and embolism, in 1 case.

Six deliveries were by forceps and 1 by version, and 13 were spontaneous.

There were 3 cases that followed manual removal of the placenta and 5 cases in which pressure reported as moderate had been applied to the fundus of the uterus. In 4 cases the third stage of labor was spontaneous; in 3 cases the placenta was attached to the inverted uterus. In 5 cases a clear history of the management of the third stage of labor could not be obtained. In 8 cases pituitrin in small doses had been given during the second or third stage of labor.

In only one case was traction on the cord admitted, but one of the cases occurred in the practice of a midwife who had pulled on cords. Only 2 of the 20 women were delivered by midwives.

COMMENT BY ADVISORY COMMITTEE

A satisfactory analysis of the deaths in this miscellaneous group of 652 cases, "other accidents of labor", is difficult. This is true particularly of the largest subgroup of 296 "other" deaths, although here the nonpuerperal contributory causes of death play an important part.

Seemingly needless interference with labor was noticeable in these cases, consisting of the use of pituitrin, operative procedures, or both. Women who had had several babies without any trouble were given pituitrin after 2, 3, 8, or 10 hours in labor, and then attempts at forceps operations were made or versions done. The study of this group of deaths caused by rupture of the uterus emphasizes very particularly the need for further education of physicians as to the danger of pituitrin. The use of pituitary extract during labor is still causing deaths from rupture of the uterus. Study of these records also would seem to show that there was no sound maternal indication for many of the operative procedures that caused the death of mothers.

Eighth child, face presentation, woman in labor 16 to 18 hours, unsuccessful application of forceps, collapse, hospitalization, version, death. Ruptured uterus was found at autopsy.

A woman was having her tenth baby; all other labors had been spontaneous with living babies. She was in labor 6 hours with a large baby. Use of "low" forceps was followed by death. Rupture of uterus was found at autopsy.

Thirteenth delivery, all others normal, breech presentation, large baby, two 4-drop doses of pituitrin in the first stage, extraction after 5 hours' labor, rupture of uterus, death.

Two previous normal labors, woman in labor 9 hours, 1 cc pituitrin, attempted forceps, version, rupture of the uterus (proved by autopsy), and death.

A primiparous woman had been in labor 6 hours. The record stated that dilatation was complete. She was given one half cc of pituitary extract. The pains ceased and there was a little bleeding. A consultant was called who diagnosed a ruptured uterus, which was proved at Cesarean section. It was a shoulder presentation. The woman died soon after the operation.

It is evident that physicians often do not suspect rupture of the uterus when there is every indication that it is present. Probably rupture of the uterus before or during labor kills far more women than is generally believed, 177 probable cases having been added to the 91 diagnosed cases after study of the schedules.

All these 268 case records were studied by a member of the advisory committee in the hope that they would yield some evidence as to the preventability of the condition. Some ruptures following Cesarean sections were spontaneous and seemingly could not have been avoided. Some cases of spontaneous rupture had fibroid tumors as a complication, and these ruptures probably could not have been prevented. In all, 30 were apparently not preventable, and 15 were probably not preventable. It was the opinion, however, of the obstetrician who examined the records that in 125 cases the rupture could have been prevented, in 59 cases it could probably have been prevented, and in 39 cases it might have been prevented.

A careful study of the 20 cases of inversion of the uterus by a member of the committee convinced him that 2 were not preventable and 2 were probably not preventable; on the other hand, 5 seemed preventable and 11 probably preventable. Of the 5 cases in which the inversion was judged preventable, 4 were thought due to improper management of the third stage and 1 to pituitrin.

ECTOPIC GESTATION

Three hundred and fourteen (4 percent) of the 7,380 women whose deaths were included in the study had ectopic gestation. Two hundred and forty-nine of these deaths were classified, according to the international list, under accidents of pregnancy (no. 143)—248 under ectopic gestation (no. 143b) and 1 (a ruptured cornual pregnancy) under "others under this title" (no. 143c). The other 65 patients developed sepsis, and their deaths were accordingly classified under puerperal septicemia (no. 146). This classification was made after the attendants had been interviewed.[1]

Table 98.—*Number and percentage of deaths and mortality rate of women whose deaths were associated with ectopic gestation in urban and rural areas of each State included in the study*

State	Women whose deaths were associated with ectopic gestation								
	Total			In urban areas			In rural areas		
	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births
Total	314	4	2.7	194	6	4.2	120	3	1.7
Alabama	14	1	1.1	4	1	1.7	10	1	.9
California	35	7	4.2	21	7	4.3	14	7	4.0
Kentucky	23	4	1.9	12	8	5.2	11	2	1.1
Maryland	13	3	2.0	11	4	3.0	2	2	.7
Michigan	73	6	3.7	59	6	4.9	14	4	1.8
Minnesota	26	5	2.6	18	8	4.7	8	3	1.3
Nebraska	18	5	3.2	4	3	2.9	14	7	3.3
New Hampshire	5	5	2.9	5	9	5.5	--------	--------	--------
North Dakota	7	4	2.4	--------	--------	--------	7	5	2.7
Oklahoma	4	1	.9	2	2	2.4	2	1	.6
Oregon	12	7	4.2	7	9	6.0	5	5	2.9
Rhode Island	6	4	2.2	6	4	2.6	--------	--------	--------
Virginia	32	4	2.8	13	5	5.2	19	4	2.1
Washington	18	6	3.9	12	7	4.9	6	5	2.7
Wisconsin	28	5	2.4	20	6	3.8	8	3	1.3

The proportion of maternal deaths that were associated with ectopic gestation, either as a primary or as a contributory condition, varied from 1 to 7 percent in the States of the study (table 98). The mortality rates ranged from 0.9 to 4.2 deaths per 10,000 live births, that for all States combined being 2.7.

DEATHS ASSOCIATED WITH ECTOPIC GESTATION IN URBAN AND RURAL AREAS

Deaths reported to be associated with ectopic gestation were more frequent in urban than in rural areas of the States. Of the 314 deaths so diagnosed, 194 occurred in the urban areas and 120 in the rural. In every State except Nebraska and North Dakota the mortality rates from deaths associated with ectopic pregnancy were higher in urban than in rural districts, the total rate for urban areas being 4.2 per 10,000 live births, as compared with 1.7 in rural areas (table 98). It is of importance in this connection that 83 percent of all maternal deaths in cities of 10,000 and more were of women who had been in hospitals, as compared with 34 percent in the rural areas.

---

[1] The 314 would all be included in ectopic gestation (no. 142) of the 1929 revision, 65 in no. 142a "with septic conditions specified," and 249 in no. 142b "without mention of septic conditions."

DEATHS ASSOCIATED WITH ECTOPIC GESTATION AMONG WHITE AND COLORED WOMEN

The mortality rate from deaths diagnosed as associated with ectopic gestation for the white women (2.5 per 10,000 live births) was less than that for the colored women (3.8) for all the States together and also for every State having 2,000 or more colored live births annually, with the exception of California and Oklahoma. Oklahoma had one of the lowest rates for white women and no deaths among the colored. In California the rate was high for both white (4.2) and colored (4.1). The Michigan rate among the colored was, however, the highest (9.2) (table 99).

Table 99.—*Number and percentage of deaths and mortality rate of white and colored women whose deaths were associated with ectopic gestation in all the States included in the study and in specified States having 2,000 or more colored births annually*

State	Women whose deaths were associated with ectopic gestation								
	Total			White			Colored		
	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births	Number	Percent of all puerperal deaths	Rate per 10,000 live births
ALL STATES INCLUDED IN THE STUDY									
Total	314	4	2.7	268	4	2.5	46	4	3.8
STATES HAVING 2,000 OR MORE COLORED BIRTHS ANNUALLY									
Alabama	14	1	1.1	7	1	0.8	7	1	1.5
California	35	7	4.2	33	7	4.2	2	(1)	4.1
Kentucky	23	4	1.9	17	3	1.5	6	7	7.8
Maryland	13	3	2.0	8	3	1.6	5	5	3.8
Michigan	73	6	3.7	67	5	3.5	6	8	9.2
Oklahoma	4	1	.9	4	2	1.0	------	------	------
Virginia	32	4	2.8	15	4	1.9	17	5	5.0

---

[1] Not shown because the number of deaths was less than 50.

MEDICAL ATTENTION AND HOSPITAL CARE

The diagnosis of ectopic gestation is difficult and is frequently made only by exploratory laparotomy or at autopsy. There is often little opportunity for clinical diagnosis. Death from ruptured ectopic gestation often comes so soon after the appearance of symptoms that some women fail to secure medical attention and some are not seen until they are moribund. Of the 314 women whose deaths were known to be associated with ectopic gestation, 4[2] had no medical care by a physician and 44 were seen by a physician only when moribund; 263 patients had been under the care of the physician for a time; for 3 the medical care was not reported. Of the 314 women, 253 (81 percent) received care in a hospital. Hospital care was naturally more frequent in urban than in rural areas; 173 (68 percent) of the 253 women who received hospital care died in cities of 10,000 or more.

The percentage of deaths diagnosed as associated with ectopic gestation in the various States was closely associated with the percentage of all women receiving hospital care. States with a smaller percentage of deaths from ectopic gestation generally had had a smaller proportion of all women who died cared for in hospitals, and States with a higher percentage of deaths from this cause had had a larger proportion of all women who died cared for in hospitals. The differences in the mortality rates from deaths associated with ectopic gestation in the various States are therefore associated with the opportunity for exact diagnosis in areas having hospital facilities. Deaths associated with ectopic gestation that occur far from hospitals are doubtless frequently certified as due to indefinite causes, such as sudden death or heart failure. Probably the medical evidence on the death certificate is often insufficient even to suggest inclusion in the puerperal group. The higher rates, therefore, are probably the more accurate (table 100).

TABLE 100.—*Relation between percentage of deaths associated with ectopic gestation and percentage of hospitalization among women dying from puerperal causes in each State included in the study*

State	Percent of deaths associated with ectopic gestation	Percent of hospitalization among women dying from puerperal causes
Alabama	1.3	29.1
Oklahoma	1.3	45.0
Maryland	3.4	72.5
Kentucky	3.6	31.8
Rhode Island	3.6	70.9
Virginia	4.2	47.3
North Dakota	4.4	59.1
Wisconsin	4.5	64.7
New Hampshire	4.6	70.6
Minnesota	5.3	70.7
Nebraska	5.5	58.7
Michigan	5.6	67.8
Washington	5.7	81.0
Oregon	6.8	76.3
California	7.1	81.3

Coefficient of correlation and probable error: $r = +0.738 \pm 0.079$.

PARITY AND AGE

Parity was reported for 262 of the 314 women; 93 were primigravidae and 169 multigravidae. These women constituted 4 percent of all the primiparae and the same percentage of all the multiparae included in the study. The 52 women whose deaths were associated with ectopic gestation for whom parity was not reported constituted 10 percent of all the women dying from puerperal causes for whom parity was not reported. The high incidence, in the ectopic-gestation group, of women for whom parity was not reported is associated with the fact that the condition is frequently of an emergency character.

---

[2] The ectopic gestation was discovered at autopsy.

Among the primiparae the percentage whose deaths were associated with ectopic gestation increased with age until the 35- to 39-year age period, after which time the number of cases was insufficient to form a reliable basis for judgment. Among the multiparae the maximum percentage (5) was reached in the age period 30 to 34 years; the percentage decreased in the periods 35 to 39 years and 40 to 44 years (table 101).

Study of the age distribution of the women whose deaths were associated with ectopic gestation as compared with all women dying from puerperal causes, according to parity, shows that the average age of primiparae diagnosed as having had ectopic gestation (28.8 years) was considerably above that of all primiparae dying from puerperal causes (23.7 years). The difference in the average age of multiparae whose deaths were associated with ectopic gestation (33 years) and of all multiparae (32.2 years) was insufficient to be statistically significant. Of the 52 women (exclusive of 1 for whom age was not reported) for whom parity was not reported and whose deaths were associated with ectopic gestation, the average age was 31.6 years, indicating the probability that they were largely of the multiparous group.

TABLE 101.—*Number and percentage of deaths associated with ectopic gestation among primiparae and multiparae dying in specified age periods from all puerperal causes*

Age period	Women dying from puerperal causes											
	Total			Primiparae			Multiparae			Of parity not reported		
	Total	Whose deaths were associated with ectopic gestation		Total	Whose deaths were associated with ectopic gestation		Total	Whose deaths were associated with ectopic gestation		Total	Whose deaths were associated with ectopic gestation	
		Number	Percent[1]		Number	Percent[1]		Number	Percent		Number	Percent[1]
Total	7,380	314	4	2,334	93	4	4,520	169	4	526	52	10
Under 15 years	25	------	------	25	------	------	------	------	------	------	------	------
15 years, under 20	855	11	1	716	9	1	118	1	1	21	1	------
20 years, under 25	1,545	40	3	802	16	2	628	15	2	115	9	8
25 years, under 30	1,537	78	5	409	31	8	995	36	4	133	11	8
30 years, under 35	1,412	87	6	218	19	9	1,084	56	5	110	12	11
35 years, under 40	1,312	70	5	114	15	13	1,092	41	4	106	14	13
40 years, under 45	570	21	4	33	2	------	507	16	3	30	3	------
45 years and over	94	6	6	4	1	------	85	4	5	5	1	------
Not reported	30	1	------	13	------	------	11	------	------	6	1	------

[1] Not shown where number of women was less than 50.

PERIODS IN WHICH SYMPTOMS BEGAN AND IN WHICH DEATHS OCCURRED

The period of pregnancy at which symptoms began was reported for 239 of the 314 cases. In all the instances in which a report was obtained symptoms were noted by the third month. Symptoms began before the fourth week in 30 cases, from the fourth to the sixth week in 39 cases, from the sixth to the ninth week in 116 cases, from the ninth to the thirteenth week in 38 cases, and at three months in 16 cases.

The estimated period of gestation was reported for 283 of the 314 women whose deaths were associated with ectopic gestation. Two hundred and nine women (74 percent) died in the first 2 months of pregnancy; 43 (15 percent) in the third month; 15 (5 percent) in the fourth month; 2 (about 1 percent) each in the fifth, sixth, seventh, and eighth months; and 8 (3 percent) in the ninth month or later.

OPERATIONS FOR ECTOPIC GESTATION

Two hundred and four of the 314 women were operated on for the ectopic gestation; 109 [3] (a surprisingly large number) died without operation for the ectopic gestation (but 10 of them had another operation other than blood transfusion), and in 1 case there was no report on this subject. Conditions with regard to the accessibility of a physician were about the same in the operated as in the nonoperated group, about two thirds of each group being in the same vicinity as a physician. Twenty-six of the 204 operations for ectopic gestation were described as elective, 175 as emergency; no report was obtained for 3.

DURATION OF SYMPTOMS BEFORE OPERATION OR BEFORE DEATH

A report concerning the duration of symptoms of ectopic gestation before operation was obtained for 160 of the 204 women who were operated on, and a report of duration before death for 86 of the 109 women who were not operated on, for the ectopic gestation. Among the women who were operated on, 16 percent had had symptoms for less than 1 day, 43 percent for less than a week, 35 percent for 1 to 3 weeks, and 23 percent for 4 weeks or more (table 102). Of the 26 women who died after elective operations, 17 were known to have

TABLE 102.—*Duration of symptoms before operation for women operated on and before death for women not operated on for ectopic gestation, among women whose deaths were associated with ectopic gestation*

Duration of symptoms	Women whose deaths were associated with ectopic gestation						
	Total		Operation for ectopic gestation				
			Yes		No		
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Not reported
Total	314		204		109		1
Duration reported	**246**	**100**	**160**	**100**	**86**	**100**	
Less than 1 day	55	22	26	16	29	34	
1 day, less than 3	37	15	23	14	14	16	
3 days, less than 7	28	11	19	12	9	10	
1 week, less than 2	38	15	30	19	8	9	
2 weeks, less than 4	33	13	26	16	7	8	
4 weeks or more	55	22	36	23	19	22	
Duration not reported	**68**		**44**		**23**		**1**

---

[3] The diagnosis in these cases was made by autopsy, by finding free blood by abdominal puncture either before or after death, or from the symptoms and physical findings

had symptoms for more than a week; the duration of the symptoms of the other 9 was not reported. Of the 86 women who died without operation for ectopic gestation, 34 percent had had symptoms for less than a day and 60 percent for less than a week.

TYPE OF OPERATION FOR ECTOPIC GESTATION

The operations just discussed included only those for ectopic gestation; in all but one case, the removal of the fetus through a cul-de-sac puncture for hematocele, a laparotomy was done. The usual operation for ectopic gestation was salpingectomy. Six women had hysterectomy as part of the operation for ectopic gestation, on account of interstitial pregnancy, adhesions, or fibroid uterus, or a combination of the three. Three of the women with ectopic pregnancies lasting into the third trimester had a dilatation of the cervix in an attempt to bring on labor.

OTHER OPERATIONS ON WOMEN WITH ECTOPIC GESTATION

Eighty-six of the women who died following ectopic gestation had had operations other than for the ectopic gestation[4]; 68 of the 86 also were operated on for the ectopic gestation (table 103). In some instances the two types of operations were performed at the same time. Thus 11 women had appendectomies at the time of the laparotomy for ectopic. For one woman the removal of the appendix and the discovery of an interstitial pregnancy took place at about the second month of pregnancy. Three months later rupture occurred, followed by laparotomy and death.

TABLE 103.—*Type of other operation performed for women operated on and not operated on for ectopic gestation among women whose deaths were associated with ectopic gestation*

Type of operation other than for ectopic gestation	Women whose deaths were associated with ectopic gestation			
	Total	Operation for ectopic gestation		
		Yes	No	Not reported
Total	314	204	109	1
Operation	**86**	**68**	**18**	
One type only	*74*	*59*	*15*	
Blood transfusion	26	18	8	
Curettage	13	11	2	
Appendectomy	12	12		
Enterostomy	9	8	1	
Incision and drainage	5	4	1	
Hysterectomy	4	4		
Other types	5	2	3	
More than one type	*12*	*9*	*3*	
Blood transfusion and curettage	5	4	1	
Incision, drainage, and blood transfusion	2	1	1	
Incision, drainage, blood transfusion, and enterostomy	1	1		
Laparotomy and blood transfusion	1	1		
Hysterectomy and blood transfusion	1	1		
Hysterectomy and curettage	1	1		
Incision, drainage, and curettage	1		1	
No operation	**227**	**136**	**91**	
Operation not reported	**1**			**1**

---

[4] See section Operations (p. 78) for operations in the first two trimesters.

Only 36 of the 314 women whose deaths were associated with ectopic gestation had blood transfusions. Twenty-six of these also had an operation for the ectopic gestation. Twenty of the 314 women were curetted. In some cases this was done under the mistaken impression that the symptoms were due to incomplete abortion. Eight of the women who died following ectopic gestation had had attempted induced abortions in the present pregnancy; five of them died of sepsis.

VIABLE FETUSES

In 12 cases the period of viability of the child was reached. Diagnosis was made either at operation or at autopsy in six cases. One living child with no deformity was delivered; the abdominal pregnancy was discovered, to the great astonishment of the surgeon, in the course of an operation that was intended to be a Cesarean section with appendectomy. "The placenta, attached to omentum and intestine, was separated without difficulty, and the patient did well for 2 days, but then developed uremia followed by coma, and died."

OBSTETRIC HISTORY OF MULTIGRAVIDAE

The past obstetric history was obtained for 140 of the 169 multigravidae; 111 were reported to have had previous pregnancies lasting into the third trimester, and the report for 60 of these showed all normal deliveries. Previous abortions were reported for 26 of the 140 women. Previous ectopic gestation was reported for 3 of the women.

COMMENT BY ADVISORY COMMITTEE

Ectopic gestation is more frequently reported as a cause of death in urban than in rural areas. But when one considers the nature of this complication and the fact that it was given as the cause of death for only four women who died without medical care, it is fair to assume that, especially in the rural areas, some of the deaths from this condition are not recognized and the cause of death is not properly assigned. This assumption is further supported by the fact that in those States where hospitalization was more frequent the diagnosis of ectopic gestation was made more frequently.

Of the 314 women whose deaths were known to be associated with ectopic gestation, 4 had no medical care and the condition was discovered at autopsy, and 44 were moribund when first seen. Eighty-one percent of these cases received hospital care. It is interesting also to note the large percentage of these cases that occurred in multigravidae. It is likewise surprising to find that 109 of these women died without operation. As is to be expected, a very large percentage of the others had emergency operations.

The fact that only 36 of these 314 women had blood transfusions shows that this life-saving procedure was not available in many of these cases, for if it had been it undoubtedly would have been used.

That emergency operating was common and that the deaths of 65 of these patients were classified as due to puerperal septicemia makes it very clear that the operative technique must be as perfect as is possible if deaths from sepsis are to be avoided. The removal of the appendix in cases of ruptured ectopic is a dangerous procedure and adds to the deaths from sepsis. (There were 11 such cases.) It has long been recognized that the opening of the gut when there is much blood in the peritoneal cavity should be avoided.

A review of the duration of symptoms suggestive of ectopic pregnancy before the operation was performed shows that only 16 percent of these cases had symptoms less than a day, while 43 percent had symptoms for a week, 35 percent had symptoms for 1 to 3 weeks, and 23 percent had symptoms for 4 weeks or more. These figures show clearly that in many cases the symptoms of the serious condition of ectopic pregnancy were ignored.

RECOMMENDATIONS BY ADVISORY COMMITTEE

Maternal deaths are due in large part to controllable causes. But how is control of these causes to be established? First, the medical profession and the public must know the facts, and then each group should take appropriate and decisive action. Physicians have the responsibility for leadership in both the medical and the community program for such control. As the facts become more widely known, others will assume this leadership if physicians do not.

Recommendations for action looking to prevention of maternal deaths are addressed to the medical profession and to the general public.

To the Medical Profession

A. Physicians must assume leadership in the field of maternal care by:

1. Informing the public that the high mortality during pregnancy, delivery, and the postpartum period is due largely to controllable causes.
2. Recognizing that every mother must have adequate prenatal, delivery, and postpartum care. (For definition of adequate see p. 43.)
3. Instructing the public as to what constitutes adequate maternal care.
4. So organizing the available resources of their communities that every mother can receive adequate maternal care.
5. Warning the public as to the dangers occasioned by abortions, spontaneous or induced.

B. In order that more accurate information may be secured relative to cause and prevention of maternal deaths:

1. Physicians should make a greater effort to study by autopsy and other scientific means every maternal and fetal death, for in many cases this is the only means of ascertaining the true cause of death.
2. Physicians are urged to exercise the greatest possible care in making out maternal and fetal death certificates, so that vital statistics may be more accurate and therefore more valuable.
3. Bureaus of vital statistics are urged to query maternal and fetal death certificates recording an indefinite cause of death; for example, "Cesarean section" alone.
4. Medical societies and departments of health in cooperation should investigate each maternal death within a few weeks of the death.

C. In order that physicians in general may have a better understanding of the fundamentals of obstetric care:

1. There should be larger and better facilities for clinical training in obstetrics.
2. Undergraduate students should have a much wider contact with obstetric patients.
3. The State medical societies, the medical schools, and State departments of health should provide or arrange for postgraduate teaching in the various counties in order to keep the local practitioner in touch with the best obstetric thought and practice.

D. It is recommended that all physicians practicing obstetrics give particular consideration to:

1. The importance of good aseptic technique, including the use of rubber gloves and masks that cover nose and mouth.
2. The danger to mothers from carriers of infection.
3. The dangers of the use of pituitrin during labor.
4. The dangers of multiple, forcible, and radical procedures in obstetrics.
5. The proper indications and contra-indications for various obstetric operations, especially (*a*) the dangers of major operations in the presence of shock and hemorrhage and (*b*) the dangers of Cesarean section after vaginal manipulations or long labor.
6. The proper selection of anesthetics.
7. The value of blood transfusions.
8. The dangers of intrauterine manipulation in cases of infected abortion.
9. The importance of taking measures to protect against acute diseases, especially infectious diseases, and of avoiding, wherever possible, the termination of pregnancy while such disease is present.
10. Knowledge of the symptoms of some of the less common but more serious complications of delivery such as rupture of the uterus.

E. It is recommended that State medical societies working in cooperation with the State departments of health consider the development of some plan by which well-trained regional obstetric consultants may be made available.

To the General Public

There should be widespread education of the public as to the following:

1. That the high maternal death rate is due largely to controllable causes.
2. That it is necessary for all women to have adequate supervision and medical care during pregnancy, labor, and the postpartum period, such supervision and care to begin early in pregnancy and to be continuous through the postpartum period—
    - *a*. In order to safeguard the health of both mother and child.
    - *b*. In order especially to control the infections, toxemias, and hemorrhages that this study and others have shown to be real menaces to life.

3. That there is danger of death or serious invalidism following abortions, spontaneous or induced.

4. That the community has a definite responsibility to provide adequate medical and nursing facilities for the care of women during pregnancy, labor, and the postpartum period. This predicates the proper organization of hospitals, outpatient services, and medical and nursing personnel and applies to both home and hospital care. The community should know the standards for hospitals taking obstetric cases that have been drawn up by the American College of Surgeons. (See below.)

5. That judicious selection of the hospital to be used for maternity care is of the greatest importance when hospitalization is planned.

6. That the better education of those caring for women during this period is essential and should have public support. This includes adequate obstetric training for medical students, postgraduate obstetric training for physicians in practice, to keep them abreast of modern developments, the training of nurses in good maternity care, and the training and supervision of midwives in communities where midwives still practice.

7. That it is important to make careful and intelligent selection of the attendant for maternal care.

STANDARDS OF AMERICAN COLLEGE OF SURGEONS FOR HOSPITALS TAKING OBSTETRIC PATIENTS

[American College of Surgeons; Twentieth Year Book. 1933
Pp. 68–69. Chicago]

(1) Segregation of obstetric patients from all others in the institution.
(2) Special facilities available for immediate segregation and isolation of all cases of infection, temperature, or other conditions inimical to the safety and welfare of patients within the department.
(3) Adequately trained personnel, the entire nursing staff to be chosen specially for work in this department and not permitted to attend other cases during time on obstetric service.
(4) Readily available, adequate laboratory and special-treatment facilities under competent supervision.
(5) Accurate and complete clinical records on all obstetric patients.
(6) Frequent consultations encouraged on obstetric service, a consultation made obligatory in all cases where major operative procedures may be indicated.
(7) Thorough analysis and review of the clinical work of the department each month by the medical staff with particular consideration to deaths, infections, complications, or such conditions as are not conducive to the best end results.
(8) Adequate theoretical instruction and practical experience for student nurses in prenatal, parturient, and postpartum care of the patient, as well as the care of the newborn.

Appendix A.—GENERAL TABLES

TABLE I.—*Cause of death*[1] *as shown by interview and trimester of pregnancy among white and colored women dying from puerperal causes in urban and rural areas*

TOTAL

Cause of death[1] as shown by interview	Women dying from puerperal causes											
	Total				In urban areas				In rural areas			
	Total	Trimester of pregnancy			Total	Trimester of pregnancy			Total	Trimester of pregnancy		
		First two	Last	Not reported		First two	Last	Not reported		First two	Last	Not reported
All causes	**7,380**	**2,381**	**4,965**	**34**	**3,462**	**1,307**	**2,148**	**7**	**3,918**	**1,074**	**2,817**	**27**
Accidents of pregnancy	719	575	142	2	351	292	58	1	368	283	84	1
Abortion, premature labor	*353*	*254*	*99*		*149*	*107*	*42*		*204*	*147*	*57*	
Ectopic gestation	*248*	*240*	*8*		*150*	*146*	*4*		*98*	*94*	*4*	
Other	*118*	*81*	*35*	*2*	*52*	*39*	*12*	*1*	*66*	*42*	*23*	*1*
Puerperal hemorrhage	791	11	779	1	331	4	327		460	7	452	1
Placenta previa	*347*	*11*	*336*		*147*	*4*	*143*		*200*	*7*	*193*	
Other	*444*		*443*	*1*	*184*		*184*		*260*		*259*	*1*
Other accidents of labor	652	1	651		294		294		358	1	357	
Cesarean section	*136*	*1*	*135*		*88*		*88*		*48*	*1*	*47*	
Other surgical operations and instrumental delivery	*109*		*109*		*56*		*56*		*53*		*53*	
Other	*407*		*407*		*150*		*150*		*257*		*257*	
Puerperal septicemia	2,948	1,403	1,529	16	1,543	819	719	5	1,405	584	810	11
Puerperal phlegmasia alba dolens, embolus, sudden death	344	53	291		157	23	134		187	30	157	
Puerperal albuminuria and convulsions	1,900	338	1,549	13	777	169	607	1	1,123	169	942	12
Following childbirth (not otherwise defined)	23		22	1	7		7		16		15	1
Puerperal diseases of the breast	3		2	1	2		2		1			1

---

[1] According to the Manual of the International List of Causes of Death, 1920.

TABLE I.—*Cause of death as shown by interview and trimester of pregnancy among white and colored women dying from puerperal causes in urban and rural areas*—Continued

WHITE

Cause of death as shown by interview	Women dying from puerperal causes											
	Total				In urban areas				In rural areas			
	Total	Trimester of pregnancy			Total	Trimester of pregnancy			Total	Trimester of pregnancy		
		First two	Last	Not reported		First two	Last	Not reported		First two	Last	Not reported
All causes	**6,072**	**2,025**	**4,027**	**20**	**2,951**	**1,143**	**1,805**	**3**	**3,121**	**882**	**2,222**	**17**
Accidents of pregnancy	613	488	125		309	259	50		304	229	75	
Abortion, premature labor	*301*	*209*	*92*		*136*	*96*	*40*		*165*	*113*	*52*	
Ectopic gestation	*210*	*205*	*5*		*128*	*126*	*2*		*82*	*79*	*3*	
Other	*102*	*74*	*28*		*45*	*37*	*8*		*57*	*37*	*20*	
Puerperal hemorrhage	670	6	663	1	290	2	288		380	4	375	1
Placenta previa	*293*	*6*	*287*		*130*	*2*	*128*		*163*	*4*	*159*	
Other	*377*		*376*	*1*	*160*		*160*		*217*		*216*	*1*
Other accidents of labor	525	1	524		244		244		281	1	280	
Cesarean section	*123*	*1*	*122*		*82*		*82*		*41*	*1*	*40*	
Other surgical operations and instrumental delivery	*97*		*97*		*48*		*48*		*49*		*49*	
Other	*305*		*305*		*114*		*114*		*191*		*191*	
Puerperal septicemia	2,437	1,209	1,218	10	1,316	721	592	3	1,121	488	626	7
Puerperal phlegmasia alba dolens, embolus, sudden death	314	45	269		146	20	126		168	25	143	
Puerperal albuminuria and convulsions	1,493	276	1,210	7	638	141	497		855	135	713	7
Following childbirth (not otherwise defined)	17		16	1	6		6		11		10	1
Puerperal diseases of the breast	3		2	1	2		2		1			1

COLORED

All causes	**1,308**	**356**	**938**	**14**	**511**	**164**	**343**	**4**	**797**	**192**	**595**	**10**
Accidents of pregnancy	106	87	17	2	42	33	8	1	64	54	9	1
Abortion, premature labor	*52*	*45*	*7*		*13*	*11*	*2*		*39*	*34*	*5*	
Ectopic gestation	*38*	*35*	*3*		*22*	*20*	*2*		*16*	*15*	*1*	
Other	*16*	*7*	*7*	*2*	*7*	*2*	*4*	*1*	*9*	*5*	*3*	*1*
Puerperal hemorrhage	121	5	116		41	2	39		80	3	77	
Placenta previa	*54*	*5*	*49*		*17*	*2*	*15*		*37*	*3*	*34*	
Other	*67*		*67*		*24*		*24*		*43*		*43*	
Other accidents of labor	127		127		50		50		77		77	
Cesarean section	*13*		*13*		*6*		*6*		*7*		*7*	
Other surgical operations and instrumental delivery	*12*		*12*		*8*		*8*		*4*		*4*	
Other	*102*		*102*		*36*		*36*		*66*		*66*	
Puerperal septicemia	511	194	311	6	227	98	127	2	284	96	184	4
Puerperal phlegmasia alba dolens, embolus, sudden death	30	8	22		11	3	8		19	5	14	
Puerperal albuminuria and convulsions	407	62	339	6	139	28	110	1	268	34	229	5
Following childbirth (not otherwise defined)	6		6		1		1		5		5	

TABLE II.—*Registration by the American Medical Association, approval by the American College of Surgeons, and bed capacity of hospitals in which women were hospitalized at death; women dying from puerperal causes*

Registration and approval of hospital, and maintenance of standards[1]	Women dying from puerperal causes																	
	Total	In hospital															Not in hospital	Not reported whether in hospital
		Total	Number of beds															
			Less than 10	10, less than 20	20, less than 35	35, less than 50	50, less than 75	75, less than 100	100, less than 125	125, less than 150	150, less than 175	175, less than 200	200, less than 225	225, less than 250	250 or more	Not reported		
Total	**7,380**	**4,066**	**85**	**245**	**439**	**284**	**557**	**264**	**499**	**236**	**226**	**139**	**146**	**157**	**757**	**32**	**3,299**	**15**
Death in hospital	*4,066*	*4,066*	*85*	*245*	*439*	*284*	*557*	*264*	*499*	*236*	*226*	*139*	*146*	*157*	*757*	*32*		
Registered by American Medical Association	**3,726**	**3,726**	**14**	**164**	**368**	**254**	**513**	**263**	**489**	**236**	**226**	**139**	**146**	**157**	**757**			
Approved by American College of Surgeons	2,338	2,338			4	21	228	165	399	217	207	129	125	126	717			
Not approved by American College of Surgeons	1,388	1,388	14	164	364	233	285	98	90	19	19	10	21	31	40			
5 standards[1] maintained	*385*	*385*		*19*	*49*	*63*	*95*	*35*	*41*	*10*	*7*	*4*	*5*	*27*	*30*			
1 or more standards not maintained	*930*	*930*	*13*	*134*	*296*	*165*	*169*	*58*	*46*	*4*	*10*	*6*	*16*	*4*	*9*			
No report on standards	*73*	*73*	*1*	*11*	*19*	*5*	*21*	*5*	*3*	*5*	*2*				*1*			
Not registered by American Medical Association[2]	**333**	**333**	**71**	**81**	**71**	**30**	**44**	**1**	**10**							**25**		
No report on registration (name of hospital not reported)	**7**	**7**														**7**		
Death not in hospital	*3,299*																*3,299*	
Not reported whether death in hospital	*15*																	*15*

---

[1] Hospital standards of the American College of Surgeons prescribe in general: (1) Organization of a staff; (2) specific qualifications for staff membership; (3) rules, regulations, and policies governing professional work of hospital; (4) complete case records; (5) diagnostic and therapeutic facilities. For complete requirements see Year Book of American College of Surgeons, 1927, p. 51. In this study data on maintenance of standards were obtained from interviews with hospital superintendents, not by inspection of the hospital.

[2] Refusal of registration means that the American Medical Association had evidence of such irregular or unsafe practices that these hospitals were "deemed unworthy of being included in any published list of reputable hospitals." Journal of American Medical Association, vol. 96, no. 13, Mar. 28, 1931, p. 1022.

TABLE III.—*Registration by the American Medical Association, approval by the American College of Surgeons, and bed capacity of hospitals in which women were hospitalized at delivery; women dying from puerperal causes who had reached the last trimester of pregnancy*

Registration and approval of hospital, and maintenance of standards [1]	Women dying from puerperal causes who had reached last trimester																
	Total	In hospital for delivery														Not in hospital for delivery	Not reported whether in hospital for delivery
		Total	Number of beds in hospital														
			Less than 10	10, less than 20	20, less than 35	35, less than 50	50, less than 75	75, less than 100	100, less than 125	125, less than 150	150, less than 175	175, less than 200	200, less than 225	225, less than 250	250 or more	Not reported		
Total	**4,965**	**1,971**	**53**	**134**	**232**	**132**	**261**	**126**	**247**	**124**	**114**	**56**	**67**	**72**	**338**	**15**	**2,990**	**4**
In hospital for delivery	*1,971*	*1,971*	*53*	*134*	*232*	*132*	*261*	*126*	*247*	*124*	*114*	*56*	*67*	*72*	*338*	*15*		
Hospital registered by American Medical Association	**1,793**	**1,793**	**7**	**95**	**194**	**121**	**238**	**126**	**241**	**124**	**114**	**56**	**67**	**72**	**338**			
Approved by American College of Surgeons	1,079	1,079				12	96	78	199	112	104	52	60	57	309			
Not approved by American College of Surgeons	714	714	7	95	194	109	142	48	42	12	10	4	7	15	29			
5 standards [1] maintained	*196*	*196*		*15*	*22*	*28*	*46*	*15*	*16*	*9*	*4*	*3*		*12*	*26*			
1 or more standards not maintained	*482*	*482*	*6*	*75*	*161*	*81*	*87*	*30*	*24*		*5*	*1*	*7*	*3*	*2*			
No report on standards	*36*	*36*	*1*	*5*	*11*		*9*	*3*	*2*	*3*	*1*				*1*			
Not registered by American Medical Association [2]	**174**	**174**	**46**	**39**	**38**	**11**	**23**		**6**							**11**		
No report on registration (name of hospital not reported)	**4**	**4**														**4**		
Not in hospital for delivery	*2,990*																*2,990*	
Not reported whether in hospital for delivery	*4*																	*4*

---

[1] Hospital standards of the American College of Surgeons prescribe in general: (1) Organization of a staff; (2) specific qualifications for staff membership; (3) rules, regulations, and policies governing professional work of hospital; (4) complete case records; (5) diagnostic and therapeutic facilities. For complete requirements see Year Book of American College of Surgeons, 1927, p. 51. In this study data on maintenance of standards were obtained from interviews with hospital superintendents, not by inspection of the hospital.

[2] Refusal of registration means that the American Medical Association had evidence of such irregular or unsafe practices that these hospitals were "deemed unworthy of being included in any published list of reputable hospitals." Journal of American Medical Association, vol. 96, no. 13, Mar. 28, 1931, p. 1022.

TABLE IV.—*Observance of minimum standards for obstetric service recommended by the American College of Surgeons,*[1] *and delivery-room and training-school facilities in hospitals in which women were hospitalized at death; women dying from puerperal causes*

Hospital technique and observance of standards for obstetric service[1]	Women dying from puerperal causes								
	Total	In hospital						Not in hospital	Not reported whether in hospital
		Total	Having delivery room and training school	Having delivery room	Having training school	Having neither delivery room nor training school	Not reported as to delivery room and training school		
Total	**7,380**	**4,066**	**2,709**	**786**	**131**	**407**	**33**	**3,299**	**15**
Death in hospital	4,066	4,066	2,709	786	131	407	33	------	------
On obstetric service	*2,306*	*2,306*	*1,589*	*453*	*48*	*215*	*1*	------	------
Hospital observing 5 standards	1,661	1,661	1,313	255	21	72	------	------	------
Hospital observing 1 or more standards	80	80	46	20	7	7	------	------	------
Hospital not observing all standards but number not reported	345	345	126	110	12	96	1	------	------
Hospital not observing standards	220	220	104	68	8	40	------	------	------
Not on obstetric service	*1,675*	*1,675*	*1,112*	*312*	*80*	*158*	*13*	------	------
Technique up to standards of American College of Surgeons	1,206	1,206	998	147	41	20	------	------	------
Technique below standards of American College of Surgeons	437	437	105	161	39	130	2	------	------
Technique not reported	32	32	9	4	------	8	11	------	------
Not reported whether on obstetric service	*85*	*85*	*8*	*21*	*3*	*34*	*19*	------	------
Death not in hospital	3,299	------	------	------	------	------	------	3,299	------
Not reported whether death in hospital	15	------	------	------	------	------	------	------	15

---

[1] Standards for obstetric service prescribe in general: (1) Segregation of obstetric patients from other types; (2) preliminary examination for infectious or contagious diseases; (3) segregation of patients having temperature from other obstetric patients; (4) aseptic technique; (5) incorporation of indications for operative procedure in case record. For complete requirements on which this classification was based see Year Book of American College of Surgeons, 1927, p. 71.

Table V.—*Observance of minimum standards for obstetric service recommended by the American College of Surgeons,*[1] *and delivery-room and training-school facilities in hospitals in which women were hospitalized at delivery; women dying from puerperal causes who had reached the last trimester of pregnancy*

Hospital technique and observance of standards for obstetric service [1]	Women dying from puerperal causes who had reached last trimester								
	Total	In hospital for delivery						Not in hospital for delivery	Not reported whether in hospital for delivery
		Total	Hospital having—				Not reported as to delivery room and training school		
			Delivery room and training school	Delivery room	Training school	Neither delivery room nor training school			
Total	**4,965**	**1,971**	**1,304**	**406**	**48**	**202**	**11**	**2,990**	**4**
In hospital for delivery	1,971	1,971	1,304	406	48	202	11	------	------
On obstetric service	*1,877*	*1,877*	*1,286*	*381*	*43*	*166*	*1*	------	------
Hospital observing 5 standards	1,332	1,332	1,046	214	21	51	------	------	------
Hospital observing 1 or more standards	66	66	40	13	5	8	------	------	------
Hospital not observing all standards but number not reported	296	296	111	96	10	78	1	------	------
Hospital not observing standards	183	183	89	58	7	29	------	------	------
Not on obstetric service [2]	*27*	*27*	*11*	*6*	*2*	*8*	------	------	------
Technique up to standards of American College of Surgeons	17	17	11	2	2	2	------	------	------
Technique below standards of American College of Surgeons	10	10	------	4	------	6	------	------	------
Not reported whether on obstetric service	*67*	*67*	*7*	*19*	*3*	*28*	*10*	------	------
Not in hospital for delivery	2,990	------	------	------	------	------	------	2,990	------
Not reported whether in hospital for delivery	4	------	------	------	------	------	------	------	

---

[1] Standards for obstetric service prescribe in general: (1) Segregation of obstetric patients from other types; (2) preliminary examination for infectious or contagious diseases; (3) segregation of patients having temperature from other obstetric patients; (4) aseptic technique; (5) incorporation of indications for operative procedure in case record. For complete requirements on which this classification was based see Year Book of American College of Surgeons, 1927, p. 71.

[2] On gynecological, surgical, or medical service.

TABLE VI.—*Cause of death* [1] *as shown by interview according to interval between delivery* [2] *and death, among women dying from puerperal causes*

Cause of death [1] as shown by interview	Women dying from puerperal causes											
	Total	Interval between delivery [2] and death										No delivery
		Less than 1 week					1 week, less than 2	2 weeks, less than 3	3 weeks, less than 4	4 weeks or more	Not reported	
		Total	Less than 1 day	1 day, less than 2	2 days, less than 3	3 days, less than 7						
All causes	7,380	3,455	1,923	332	240	960	1,190	591	315	752	420	657
Abortion, premature labor	353	220	105	28	20	67	37	28	2	17	42	7
Ectopic gestation	248	160	82	22	15	41	25	11	2	6	38	6
Other accidents of pregnancy	118	39	21	10	3	5	3	4	1		4	67
Placenta previa	347	280	254	8	5	13	5	2	3		7	50
Other puerperal hemorrhage	444	407	379	12	2	14	12	3	2	5	9	6
Cesarean section	136	106	31	8	7	60	18	6	1	3	1	1
Other surgical operations and instrumental delivery	109	95	73	7	6	9	4	2	1	1	2	4
Other accidents of labor	407	241	133	29	21	58	61	22	10	19	18	36
Puerperal septicemia	2,948	596	43	43	51	459	804	454	241	578	252	23
Puerperal phlegmasia alba dolens, embolus, sudden death	344	144	105	6		33	93	28	24	27	9	19
Puerperal albuminuria and convulsions	1,900	1,163	696	159	109	199	123	31	27	82	37	437
Following childbirth (not otherwise defined)	23	4	1		1	2	5		1	12	1	
Puerperal diseases of the breast	3									2		1

---

[1] According to the Manual of the International List of Causes of Death, 1920.
[2] Also abortion, operation for ectopic gestation, or rupture of unoperated ectopic gestation.

TABLE VII.—*Cause of death* [1] *as shown by interview and number of pregnancies among women dying from puerperal causes*

Cause of death [1] as shown by interview	Women dying from puerperal causes												
	Total	Number of pregnancies											
		1	2	3	4	5	6	7	8	9	10 or more	More than 1 but number not specified	Not reported
All causes	**7,380**	**2,334**	**922**	**777**	**571**	**426**	**340**	**267**	**205**	**142**	**372**	**498**	**526**
Accidents of pregnancy	719	176	101	75	54	34	41	23	16	12	24	79	84
Abortion, premature labor	*353*	*66*	*43*	*38*	*27*	*22*	*25*	*18*	*10*	*9*	*22*	*40*	*33*
Ectopic gestation	*248*	*77*	*38*	*29*	*21*	*6*	*7*	*3*	*3*		*1*	*21*	*42*
Other	*118*	*33*	*20*	*8*	*6*	*6*	*9*	*2*	*3*	*3*	*1*	*18*	*9*
Puerperal hemorrhage	791	153	88	101	73	59	45	45	45	34	78	40	30
Placenta previa	*347*	*39*	*42*	*46*	*32*	*33*	*21*	*17*	*25*	*11*	*40*	*23*	*18*
Other	*444*	*114*	*46*	*55*	*41*	*26*	*24*	*28*	*20*	*23*	*38*	*17*	*12*
Other accidents of labor	652	203	86	68	40	45	35	31	26	20	45	28	25
Cesarean section	*136*	*63*	*23*	*17*	*11*	*7*	*1*	*4*	*2*	*1*	*3*	*3*	*1*
Other surgical operations and instrumental delivery	*109*	*60*	*9*	*8*	*3*	*5*	*1*	*2*	*4*	*2*	*10*	*4*	*1*
Other	*407*	*80*	*54*	*43*	*26*	*33*	*33*	*25*	*20*	*17*	*32*	*21*	*23*
Puerperal septicemia	2,948	857	390	316	254	165	121	94	73	44	116	238	280
Puerperal phlegmasia alba dolens, embolus, sudden death	344	106	50	46	32	18	20	13	9	7	20	16	7
Puerperal albuminuria and convulsions	1,900	830	204	167	118	104	78	58	36	25	88	96	96
Following childbirth (not otherwise defined)	23	8	3	4		1		3				1	3
Puerperal diseases of the breast	3	1									1		1

---

[1] According to the Manual of the International List of Causes of Death, 1920.

TABLE VIII.—*Cause of death [1] as shown by interview and parity among women dying in specified age periods from puerperal causes*

Cause of death [1] as shown by interview	Women dying from puerperal causes																
	Total		Age at death														
			Under 20 years		20 years, under 25		25 years, under 30		30 years, under 35		35 years, under 40		40 years, under 45		45 years and over		Not reported
	Number	Percent distribution [2]	Number	Percent distribution [2]	Number	Percent distribution [2]	Number	Percent distribution [2]	Number	Percent distribution [2]	Number	Percent distribution [2]	Number	Percent distribution [2]	Number	Percent distribution [2]	
All causes	**7,380**	**100**	**880**	**100**	**1,545**	**100**	**1,537**	**100**	**1,412**	**100**	**1,312**	**100**	**570**	**100**	**94**	**100**	**30**
Accidents of pregnancy	719	10	50	6	122	8	150	10	169	12	150	11	62	11	12	13	4
Abortion, premature labor	353	5	27	3	66	4	73	5	78	6	71	5	29	5	6	6	3
Ectopic gestation	248	3	10	1	33	2	56	4	72	5	54	4	19	3	4	4	------
Other	118	2	13	1	23	1	21	1	19	1	25	2	14	2	2	2	1
Puerperal hemorrhage	791	11	46	5	120	8	139	9	178	13	196	15	93	16	16	17	3
Other accidents of labor	652	9	63	7	99	6	139	9	135	10	144	11	65	11	6	6	1
Cesarean section	136	2	7	1	19	1	26	2	39	3	31	2	14	2	------	------	------
Other surgical operations and instrumental delivery	109	1	21	2	18	1	21	1	14	1	21	2	12	2	2	2	------
Other	407	6	35	4	62	4	92	6	82	6	92	7	39	7	4	4	1
Puerperal septicemia	2,948	40	366	42	694	45	690	45	546	39	446	34	157	28	36	38	13
Puerperal phlegmasia alba dolens, embolus, sudden death	344	5	20	2	67	4	78	5	73	5	65	5	35	6	4	4	2
Puerperal albuminuria and convulsions	1,900	26	332	38	436	28	334	22	306	22	309	24	157	28	19	20	7
Following childbirth (not otherwise defined)	23	(3)	3	(3)	5	(3)	7	(3)	4	(3)	2	(3)	1	(3)	1	1	------
Puerperal diseases of the breast	3	(3)	------	------	2	(3)	------	------	1	(3)	------	------	------	------	------	------	------

PRIMIPARAE

All causes	**2,334**	**100**	**741**	**100**	**802**	**100**	**409**	**100**	**218**	**100**	**114**	**100**	**33**	-----	**4**	-----	**13**
Accidents of pregnancy	176	8	39	5	44	5	44	11	29	13	11	10	6	-----	1	-----	2
Abortion, premature labor	*66*	*3*	*20*	*3*	*22*	*3*	*11*	*3*	*9*	*4*	-----	-----	*2*	-----	-----	-----	*2*
Ectopic gestation	*77*	*3*	*8*	*1*	*13*	*2*	*27*	*7*	*17*	*8*	*9*	*8*	*2*	-----	*1*	-----	-----
Other	*33*	*1*	*11*	*1*	*9*	*1*	*6*	*1*	*3*	*1*	*2*	*2*	*2*	-----	-----	-----	-----
Puerperal hemorrhage	153	7	35	5	52	6	32	8	15	7	17	15	-----	-----	1	-----	1
Other accidents of labor	203	9	49	7	58	7	47	11	28	13	13	11	8	-----	-----	-----	-----
Cesarean section	*63*	*3*	*7*	*1*	*16*	*2*	*10*	*2*	*17*	*8*	*6*	*5*	*7*	-----	-----	-----	-----
Other surgical operations and instrumental delivery	*60*	*3*	*21*	*3*	*13*	*2*	*16*	*4*	*5*	*2*	*4*	*4*	*1*	-----	-----	-----	-----
Other	*80*	*3*	*21*	*3*	*29*	*4*	*21*	*5*	*6*	*3*	*3*	*3*	-----	-----	-----	-----	-----
Puerperal septicemia	857	37	295	40	307	38	143	35	66	30	29	25	10	-----	-----	-----	7
Puerperal phlegmasia alba dolens, embolus, sudden death	106	5	14	2	44	5	23	6	16	7	6	5	3	-----	-----	-----	-----
Puerperal albuminuria and convulsions	830	36	306	41	294	37	118	29	63	29	38	33	6	-----	2	-----	3
Following childbirth (not otherwise defined)	8	(3)	3	(3)	2	(3)	2	(3)	1	(3)	-----	-----	-----	-----	-----	-----	-----
Puerperal diseases of the breast	1	(3)	-----	-----	1	(3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

MULTIPARAE

All causes	**4,520**	**100**	**118**	**100**	**628**	**100**	**995**	**100**	**1,084**	**100**	**1,092**	**100**	**507**	**100**	**85**	**100**	**11**
Accidents of pregnancy	459	10	9	8	60	10	90	9	117	11	119	11	53	10	10	12	1
Abortion, premature labor	*254*	*6*	*6*	*5*	*35*	*6*	*53*	*5*	*60*	*6*	*66*	*6*	*27*	*5*	*6*	*7*	*1*
Ectopic gestation	*129*	*3*	*1*	*1*	*13*	*2*	*23*	*2*	*44*	*4*	*32*	*3*	*14*	*3*	*2*	*2*	-----
Other	*76*	*2*	*2*	*2*	*12*	*2*	*14*	*1*	*13*	*1*	*21*	*2*	*12*	*2*	*2*	*2*	-----
Puerperal hemorrhage	608	13	10	8	60	10	101	10	154	14	173	16	93	18	15	18	2
Other accidents of labor	424	9	13	11	37	6	83	8	105	10	124	11	55	11	6	7	1
Cesarean section	*72*	*2*	-----	-----	*3*	(3)	*15*	*2*	*22*	*2*	*25*	*2*	*7*	*1*	-----	-----	-----
Other surgical operations and instrumental delivery	*48*	*1*	-----	-----	*5*	*1*	*5*	*1*	*9*	*1*	*17*	*2*	*10*	*2*	*2*	*2*	-----
Other	*304*	*7*	*13*	*11*	*29*	*5*	*63*	*6*	*74*	*7*	*82*	*8*	*38*	*7*	*4*	*5*	*1*
Puerperal septicemia	1,811	40	59	50	321	51	469	47	429	40	364	33	134	26	33	39	2
Puerperal phlegmasia alba dolens, embolus, sudden death	231	5	5	4	23	4	53	5	56	5	57	5	31	6	4	5	2
Puerperal albuminuria and convulsions	974	22	22	19	124	20	196	20	219	20	253	23	141	28	16	19	3
Following childbirth (not otherwise defined)	12	(3)	-----	-----	3	(3)	3	(3)	3	(3)	2	(3)	-----	-----	1	1	-----
Puerperal diseases of the breast	1	(3)	-----	-----	-----	-----	-----	-----	1	(3)	-----	-----	-----	-----	-----	-----	-----

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Not shown where number was less than 50.

[3] Less than 1 percent.

TABLE VIII.—*Cause of deaths as shown by interview and parity among women dying in specified age periods from puerperal causes*—Contd.

PARITY NOT REPORTED

Cause of death as shown by interview	Women dying from puerperal causes																
	Total		Age at death														
			Under 20 years		20 years, under 25		25 years, under 30		30 years, under 35		35 years, under 40		40 years, under 45		45 years and over		Not reported
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	
All causes	**526**	**100**	**21**		**115**	**100**	**133**	**100**	**110**	**100**	**106**	**100**	**30**		**5**		**6**
Accidents of pregnancy	84	16	2		18	16	16	12	23	21	20	19	3		1		1
Abortion, premature labor	*33*	*6*	*1*		*9*	*8*	*9*	*7*	*9*	*8*	*5*	*5*					
Ectopic gestation	*42*	*8*	*1*		*7*	*6*	*6*	*5*	*11*	*10*	*13*	*12*	*3*		*1*		
Other	*9*	*2*			*2*	*2*	*1*	*1*	*3*	*3*	*2*	*2*					*1*
Puerperal hemorrhage	30	6	1		8	7	6	5	9	8	6	6					
Other accidents of labor	25	5	1		4	3	9	7	2	2	7	7	2				
Cesarean section	*1*	(3)					*1*	*1*									
Other surgical operations and instrumental delivery	*1*	(3)											*1*				
Other	*23*	*4*	*1*		*4*	*3*	*8*	*6*	*2*	*2*	*7*	*7*	*1*				
Puerperal septicemia	280	53	12		66	57	78	59	51	46	53	50	13		3		4
Puerperal phlegmasia alba dolens, embolus, sudden death	7	1	1				2	2	1	1	2	2	1				
Puerperal albuminuria and convulsions	96	18	4		18	16	20	15	24	22	18	17	10		1		1
Following childbirth (not otherwise defined)	3	1					2	2					1				
Puerperal diseases of the breast	1	(3)			1	1											

---

[3] Less than 1 percent.

TABLE IX.—*Prenatal care received by white and colored unmarried women dying in urban and rural areas from puerperal causes*

Grade[1] of prenatal care	Unmarried women dying from puerperal causes		
	Total	In urban areas	In rural areas
Total	509	253	256
Grade I	10	9	1
Grade II	21	18	3
Grade III	54	34	20
Ungraded	1	1	
No prenatal care	238	79	159
No report on prenatal care	41	27	14
Inapplicable[2]	144	85	59
WHITE			
Total	246	142	104
Grade I	9	8	1
Grade II	13	11	2
Grade III	19	10	9
No prenatal care	78	29	49
No report on prenatal care	17	13	4
Inapplicable[2]	110	71	39
COLORED			
Total	263	111	152
Grade I	1	1	
Grade II	8	7	1
Grade III	35	24	11
Ungraded	1	1	
No prenatal care	160	50	110
No report on prenatal care	24	14	10
Inapplicable[2]	34	14	20

---

[1] For criteria as to grading see p. 43.
[2] Induced abortions and cases in which pregnancy terminated before the third month.

TABLE X.—*Hospitalization and trimester of pregnancy of unmarried women dying from puerperal causes*

Trimester of pregnancy and hospitalization at delivery or abortion	Unmarried women dying from puerperal causes				
	Total	Hospital cases			Not hospital cases
		Total	Died in hospital		
			Yes	No	
Total	**509**	**269**	**259**	**10**	**240**
Last trimester	287	139	135	4	148
In hospital	*139*	*139*	*135*	*4*	
Emergency	70	70	69	1	
Planned	44	44	41	3	
Not reported	25	25	25		
Not in hospital	*148*				*148*
First 2 trimesters	219	129	123	6	90
In hospital	*129*	*129*	*123*	*6*	
Not in hospital	*90*				*90*
Trimester not reported	3	1	1		2
In hospital	*1*	*1*	*1*		
Not in hospital	*2*				*2*

TABLE XI.—*Type of operation for delivery in each trimester of pregnancy and cause of death [1] as shown by interview among women dying from puerperal causes*

Type of operation for delivery	Women dying from puerperal causes										
	Total	Cause of death [1] as shown by interview									
		Accidents of pregnancy	Placenta previa	Other puerperal hemorrhage	Cesarean section	Other surgical operations and instrumental delivery	Other accidents of labor	Puerperal septicemia	Puerperal phlegmasia alba dolens, embolus, sudden death	Puerperal albuminuria and convulsions	Other causes
All deaths	**7,380**	**719**	**347**	**444**	**136**	**109**	**407**	**2,948**	**344**	**1,900**	**26**
FIRST TRIMESTER											
Total	*1,299*	*363*						*838*	*18*	*80*	
Therapeutic abortion	84	38						18	1	27	
Laparotomy for ectopic gestation	170	128						42			
No operation	1,044	197						777	17	53	
No report on operation	1							1			
SECOND TRIMESTER											
Total	*672*	*140*	*10*		*1*			*251*	*27*	*243*	
Therapeutic abortion	117	23	2					24	3	65	
Laparotomy for ectopic gestation	13	11						2			
Other operation	24	4	1		1			6		12	
No operation	514	102	6					218	24	164	
No report on operation	4		1					1		2	
FIRST OR SECOND TRIMESTER, PERIOD NOT SPECIFIED											
Total	*410*	*72*	*1*					*314*	*8*	*15*	
Therapeutic abortion	4							2		2	
Laparotomy for ectopic gestation	12	4						8			
No operation	387	67	1					298	8	13	
No report on operation	7	1						6			

LAST TRIMESTER

Total	*4,965*	*142*	*336*	*443*	*135*	*109*	*407*	*1,529*	*291*	*1,549*	*24*
Forceps:											
Only	518	1	14	57		55	41	165	42	142	1
With dilatation of cervix	150	3	14	12		6	3	13	3	95	1
With manual removal of placenta	24		1	7		2	1	6	2	5	
With dilatation of cervix and manual removal of placenta	12		3	2				1		6	
With other operation	14		1	3		3		1	1	5	
Cesarean section:											
Only	469	3	26	15	110		7	112	1	195	
Following other operation	62			1	25		3	28		5	
Version:											
Only	218	3	58	22		7	19	64	8	37	
With dilatation of cervix	224	2	78	18		1	3	25	3	94	
With dilatation of cervix and manual removal of placenta	48	2	23	6		1		7		9	
With manual removal of placenta	26		7	5		3	3	5		3	
With forceps	64	1	4	6		10	4	24	4	11	
With dilatation of cervix and forceps	21		7	3				3		8	
With forceps and manual removal of placenta	10		1	3		1	1	4			
With dilatation of cervix, forceps, and manual removal of placenta	3					2				1	
With other operation	4		1			1	1			1	
Dilatation of cervix:											
Only	108	2	12	4			4	21	3	62	
With manual removal of placenta	4		2							2	
Manual removal of placenta	87		2	34			5	40	6		
Craniotomy or embryotomy following other operation	57			6		15	4	27		5	
Breech extraction:											
Only	42		6	7		1	4	10	5	9	
With dilatation of cervix and/or manual removal of placenta	23		4	7		1	2	4		4	1
Laparotomy for ectopic gestation	8	6						2			
Other single operations	12		2	1			4	4		1	
Other operations of more than 1 type	8	1	1	1			1	3		1	
Type of operation not reported	9		2				1	4		1	1
No operation	2,607	116	61	214			278	901	206	813	18
No report on operation	133	2	6	9			18	55	7	34	2

TRIMESTER NOT REPORTED

Total	*34*	*2*		*1*				*16*		*13*	*2*
No operation	10	1		1				3		4	1
No report on operation	24	1						13		9	1

---

[1] According to the Manual of the International List of Causes of Death, 1920.

Table XII.—*Type of operation for delivery and number of pregnancies among women dying from puerperal causes who had reached the last trimester of pregnancy*

Type of operation for delivery	Women dying from puerperal causes who had reached last trimester												
	Total	Number of pregnancies											
		1	2	3	4	5	6	7	8	9	10 or more	More than 1 but number not specified	Not reported
Total	4,965	1,746	633	508	359	302	246	205	161	124	302	201	178
Forceps:													
Only	518	305	50	28	19	22	22	12	9	10	15	18	8
With dilatation of cervix	150	79	9	13	8	6	6	4	7	3	10	5	-
With manual removal of placenta	24	13	4	1	-	-	1	-	-	1	3	-	1
With dilatation of cervix and manual removal of placenta	12	7	2	2	-	-	-	-	1	-	-	-	-
With other operation	14	4	2	2	2	-	2	-	1	-	1	-	-
Cesarean section:													
Only	469	250	67	40	29	18	7	15	8	5	16	10	4
Following other operation	62	42	7	1	2	5	-	2	-	1	-	1	1
Version:													
Only	218	46	25	20	20	17	11	11	14	5	34	11	4
With dilatation of cervix	224	56	31	27	20	16	16	7	15	11	13	9	3
With dilatation of cervix and manual removal of placenta	48	10	7	4	2	7	3	3	7	-	4	-	1
With manual removal of placenta	26	1	2	4	2	1	3	1	2	2	3	5	-
With forceps	64	40	4	4	4	2	1	1	-	2	3	2	1
With dilatation of cervix and forceps	21	7	3	3	3	-	2	2	-	-	1	-	-
With forceps and manual removal of placenta	10	2	2	-	1	3	-	-	-	2	-	-	-
With dilatation of cervix, forceps, and manual removal of placenta	3	1	1	1	-	-	-	-	-	-	-	-	-
With other operation	4	1	-	1	1	-	-	1	-	-	-	-	-
Dilatation of cervix:													
Only	108	37	15	12	10	5	7	6	3	1	8	3	1
With manual removal of placenta	4	1	1	1	-	-	-	-	-	1	-	-	-
Manual removal of placenta	87	26	11	11	5	6	1	5	2	5	11	3	1
Craniotomy or embryotomy following other operation	57	22	9	6	2	1	2	4	4	1	4	2	-
Breech extraction:													
Only	42	11	6	4	1	4	2	3	1	1	7	1	1
With dilatation of cervix and/or manual removal of placenta	23	4	2	6	2	4	3	-	-	1	-	-	1
Laparotomy for ectopic gestation	8	2	-	1	1	1	1	1	-	-	-	1	-
Other single operations	12	3	-	1	-	2	1	-	1	2	1	1	-
Other operations of more than 1 type	8	1	3	1	-	-	1	1	1	-	-	-	-
Type of operation not reported	9	1	1	-	-	-	1	-	-	-	1	1	4
No operation	2,607	747	355	300	219	176	151	125	84	65	160	122	103
No report on operation	133	27	14	14	6	6	2	1	1	5	7	6	44

TABLE XIII.—*Onset of labor, cause of death* [1] *as shown by interview, and trimester of pregnancy among white and colored women dying from puerperal causes*

Onset of labor, and color	Women dying from puerperal causes										
	Total	Cause of death [1] as shown by interview									
		Accidents of pregnancy	Placenta previa	Other puerperal hemorrhage	Cesarean section	Other surgical operations and instrumental delivery	Other accidents of labor	Puerperal septicemia	Puerperal phlegmasia alba dolens, embolus, sudden death	Puerperal albuminuria and convulsions	Other causes
All deaths	**7,380**	**719**	**347**	**444**	**136**	**109**	**407**	**2,948**	**344**	**1,900**	**26**
FIRST TWO TRIMESTERS											
Total	**2,381**	**575**	**11**		**1**			**1,403**	**53**	**338**	
Spontaneous	*598*	*152*	*2*					*347*	*28*	*69*	
Artificial	*999*	*113*	*3*		*1*			*761*	*14*	*107*	
Operative [2]	729	84	3		1			532	6	103	
Medical [3]	30	10						18		2	
Method not reported	240	19						211	8	2	
No onset	*515*	*279*	*3*					*69*	*6*	*158*	
Onset not reported	*269*	*31*	*3*					*226*	*5*	*4*	
White	2,025	488	6		1			1,209	45	276	
Spontaneous	*478*	*123*	*1*					*274*	*24*	*56*	
Artificial	*917*	*107*	*2*		*1*			*697*	*13*	*97*	
Operative [2]	684	80	2		1			502	6	93	
Medical [3]	27	9						16		2	
Method not reported	206	18						179	7	2	
No onset	*426*	*239*	*2*					*61*	*3*	*121*	
Onset not reported	*204*	*19*	*1*					*177*	*5*	*2*	

---

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Operative induction of labor; also includes Cesarean section on women not in labor.

[3] Induction of labor by use of drugs alone.

TABLE XIII.—*Onset of labor, cause of death as shown by interview, and trimester of pregnancy among white and colored women dying from puerperal causes*—Continued

Onset of labor, and color	Women dying from puerperal causes										
	Total	Cause of death as shown by interview									
		Accidents of pregnancy	Placenta previa	Other puerperal hemorrhage	Cesarean section	Other surgical operations and instrumental delivery	Other accidents of labor	Puerperal septicemia	Puerperal phlegmasia alba dolens, embolus sudden death	Puerperal albuminuria and convulsions	Other causes
FIRST TWO TRIMESTERS—Continued											
Colored	356	87	5					194	8	62	
Spontaneous	*120*	*29*	*1*					*73*	*4*	*13*	
Artificial	*82*	*6*	*1*					*64*	*1*	*10*	
Operative [2]	45	4	1					30		10	
Medical [3]	3	1						2			
Method not reported	34	1						32	1		
No onset	*89*	*40*	*1*					*8*	*3*	*37*	
Onset not reported	*65*	*12*	*2*					*49*		2	
LAST TRIMESTER											
Total	**4,965**	**142**	**336**	**443**	**135**	**109**	**407**	**1,529**	**291**	**1,549**	**24**
Spontaneous	*3,815*	*102*	*178*	*390*	*87*	*107*	*373*	*1,386*	*271*	*902*	*19*
Artificial	*687*	*8*	*113*	*36*	*44*	*2*	*9*	*85*	*6*	*383*	*1*
Operative [2]	650	8	108	34	43	1	7	73	5	370	1
Medical [3]	34		5	2	1	1	2	12	1	10	
Method not reported	3									3	
No onset	*264*	*28*	*19*	*2*			*2*	*4*	*6*	*203*	
Onset not reported	*199*	*4*	*26*	*15*	*4*		*23*	*54*	*8*	*61*	*4*

White	4,027	125	287	376	122	97	305	1,218	269	1,210	18
Spontaneous	*3,069*	*92*	*140*	*334*	*75*	*95*	*284*	*1,096*	*251*	*687*	*15*
Artificial	*618*	*8*	*109*	*30*	*43*	*2*	*8*	*77*	*5*	*335*	*1*
Operative [2]	589	8	104	29	42	1	7	67	4	326	1
Medical [3]	28		5	1	1	1	1	10	1	8	
Method not reported	1									1	
No onset	*192*	*22*	*14*	*1*			*1*	*3*	*6*	*145*	
Onset not reported	*148*	*3*	*24*	*11*	*4*		*12*	*42*	*7*	*43*	*2*
Colored	938	17	49	67	13	12	102	311	22	339	6
Spontaneous	*746*	*10*	*38*	*56*	*12*	*12*	*89*	*290*	*20*	*215*	*4*
Artificial	*69*		*4*	*6*	*1*		*1*	*8*	*1*	*48*	
Operative [2]	61		4	5	1			6	1	44	
Medical [3]	6			1			1	2		2	
Method not reported	2									2	
No onset	*72*	*6*	*5*	*1*			*1*	*1*		*58*	
Onset not reported	*51*	*1*	*2*	*4*			*11*	*12*	*1*	*18*	*2*

TRIMESTER NOT REPORTED

Total	**34**	**2**		**1**				**16**		**13**	**2**
White	20			1				10		7	2
Colored	14	2						6		6	

---

[2] Operative induction of labor; also includes Cesarean section on woman not in labor.
[3] Induction of labor by use of drugs alone.

TABLE XIV.—*Termination of labor, cause of death [1] as shown by interview, and trimester of pregnancy among white and colored women dying from puerperal causes*

Termination of labor, and color	Women dying from puerperal causes										
	Total	Cause of death [1] as shown by interview									
		Accidents of pregnancy	Placenta previa	Other puerperal hemorrhage	Cesarean section	Other surgical operations and instrumental delivery	Other accidents of labor	Puerperal septicemia	Puerperal phlegmasia alba dolens, embolus, sudden death	Puerperal albuminuria and convulsions	Other causes
All deaths	**7,380**	**719**	**347**	**444**	**136**	**109**	**407**	**2,948**	**344**	**1,900**	**26**
FIRST TWO TRIMESTERS											
Total	**2,381**	**575**	**11**	----	**1**	----	----	**1,403**	**53**	**338**	----
Spontaneous	1,005	158	----	----	----	----	----	732	29	86	----
Artificial	265	63	3	----	1	----	----	113	5	80	----
No termination	560	295	7	----	----	----	----	79	11	168	----
Termination not reported	551	59	1	----	----	----	----	479	8	4	----
White	*2,025*	*488*	*6*	----	*1*	----	----	*1,209*	*45*	*276*	----
Spontaneous	845	130	----	----	----	----	----	619	27	69	----
Artificial	242	57	3	----	1	----	----	102	5	74	----
No termination	465	255	3	----	----	----	----	70	7	130	----
Termination not reported	473	46	----	----	----	----	----	418	6	3	----
Colored	*356*	*87*	*5*	----	----	----	----	*194*	*8*	*62*	----
Spontaneous	160	28	----	----	----	----	----	113	2	17	----
Artificial	23	6	----	----	----	----	----	11	----	6	----
No termination	95	40	4	----	----	----	----	9	4	38	----
Termination not reported	78	13	1	----	----	----	----	61	2	1	----

LAST TRIMESTER

Total	**4,965**	**142**	**336**	**443**	**135**	**109**	**407**	**1,529**	**291**	**1,549**	**24**
Spontaneous	2,425	89	38	249			257	958	203	614	17
Artificial	1,990	21	248	178	134	105	94	507	69	630	4
No termination [2]	412	30	43	6	1	4	36	11	12	269	
Termination not reported	138	2	7	10			20	53	7	36	3
White	*4,027*	*125*	*287*	*376*	*122*	*97*	*305*	*1,218*	*269*	*1,210*	*18*
Spontaneous	1,940	81	31	209			193	758	186	469	13
Artificial	1,684	18	218	154	121	94	78	409	65	524	3
No termination [2]	298	24	31	4	1	3	25	6	12	192	
Termination not reported	105	2	7	9			9	45	6	25	2
Colored	*938*	*17*	*49*	*67*	*13*	*12*	*102*	*311*	*22*	*339*	*6*
Spontaneous	485	8	7	40			64	200	17	145	4
Artificial	306	3	30	24	13	11	16	98	4	106	1
No termination [2]	114	6	12	2		1	11	5		77	
Termination not reported	33			1			11	8	1	11	1

TRIMESTER NOT REPORTED

Total	**34**	**2**		**1**				**16**		**13**	**2**
White	*20*			*1*				*10*		*7*	*2*
Colored	*14*	*2*						*6*		*6*	

---

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Includes cases in which there was no issue and in which the delivery was postmortem.

TABLE XV.—*Type of operation other than for delivery, cause of death* [1] *as shown by interview, and trimester of pregnancy among women dying from puerperal causes*

Type of operation other than for delivery	Women dying from puerperal causes											
	Total	Cause of death [1] as shown by interview										
		Abortion, premature labor	Ectopic gestation	Other accidents of pregnancy	Placenta previa	Other puerperal hemorrhage	Cesarean section	Other accidents of labor	Puerperal septicemia	Puerperal phlegmasia alba dolens, embolus, sudden death	Puerperal albuminuria and convulsions	Other causes
All deaths	7,380	353	248	118	347	444	136	516	2,948	344	1,900	26
FIRST TWO TRIMESTERS												
Total	**2,381**	**254**	**240**	**81**	**11**		**1**		**1,403**	**53**	**338**	
1 type only:												
Blood transfusion	81	5	20						50		6	
Curettage	453	45	10	3	1				376	9	9	
Hysterectomy	15	2	3	1					9			
Other laparotomies [2]	108	5	14	4					78	2	5	
Incision and drainage for infection	46		1						45			
Packing of uterus or cervix	27	11	1						15			
Other operation	11		2						7		2	
More than 1 type:												
Curettage	158	12	5						139	2		
With blood transfusion	*57*	*1*	*4*						*45*	*1*		
With hysterectomy	*1*		*1*									
With other laparotomies	*42*	*1*							*41*			
With incision and drainage for infection	*25*								*25*			
With packing of uterus or cervix	*23*	*2*							*20*	*1*		
With blood transfusion and packing of uterus or cervix	*3*	*1*							*2*			
With laparotomy and other operation	*4*								*4*			
With incision and drainage and blood transfusion	*1*								*1*			
With other operation	*2*	*1*							*1*			
Blood transfusion and packing of uterus or cervix	3	2									1	
Hysterectomy and other operation	3		1						2			
Other laparotomies [2] and other operation	8								8			
Incision and drainage for infection and other operation	9								9			
Packing of uterus or cervix and other operation	1								1			
Other operations	1		1									
Type of operation not reported	5	1							4			
No operation	1,399	166	181	73	8		1		620	39	311	
No report on operation	53	5	1		2				40	1	4	

LAST TRIMESTER

Total	**4,965**	**99**	**8**	**35**	**336**	**443**	**135**	**516**	**1,529**	**291**	**1,549**	**24**
1 type only:												
Blood transfusion	149	---	1	1	13	11	2	8	95	2	16	---
Curettage	84	---	---	---	---	4	---	---	77	---	3	---
Hysterectomy	24	---	---	---	---	2	6	6	9	---	1	---
Other laparotomies [2]	81	3	1	---	1	---	3	2	66	1	4	---
Incision and drainage for infection	45	1	---	---	---	---	---	---	41	1	1	1
Packing of uterus or cervix	121	3	---	---	25	68	---	6	16	---	3	---
Replacement of inverted uterus	7	---	---	---	---	5	---	1	1	---	---	---
Other operation	35	1	---	---	2	2	4	5	17	1	1	2
More than 1 type:												
Curettage	25	---	---	---	---	1	---	---	23	---	1	---
With blood transfusion	*14*	---	---	---	---	*1*	---	---	*13*	---	---	---
With laparotomy other than hysterectomy	*2*	---	---	---	---	---	---	---	*2*	---	---	---
With incision and drainage for infection	*2*	---	---	---	---	---	---	---	*2*	---	---	---
With packing of uterus or cervix	*2*	---	---	---	---	---	---	---	*2*	---	---	---
With laparotomy and other operation	*2*	---	---	---	---	---	---	---	*2*	---	---	---
With packing of uterus or cervix and other operation	*1*	---	---	---	---	---	---	---	---	---	*1*	---
With incision and drainage and blood transfusion	*2*	---	---	---	---	---	---	---	*2*	---	---	---
Blood transfusion and packing of uterus or cervix	13	---	---	---	2	4			7	---	---	---
Hysterectomy and other operation	10	---	---	---	---	2	2	2	4	---	---	---
Other laparotomies [2] and other operation	15	---	---	---	---	---	1	2	11	---	1	---
Incision and drainage for infection and other operation	19	---	---	---	---	---	---	---	19	---	---	---
Packing of uterus or cervix and other operation	1	---	---	---	---	---	---	---	---	1	---	---
Other operations	5	---	---	---	---	---	---	---	5	---	---	---
Type of operation not reported	2	---	---	---	---	---	---	---	2	---	---	---
No operation	4,203	89	6	34	287	334	117	467	1,092	278	1,480	19
No report on operation	126	2	---	---	6	10	---	17	44	7	38	2

TRIMESTER NOT REPORTED

Total	**34**	---	---	**2**	---	**1**	---	---	**16**	---	**13**	**2**
Hysterectomy and other operation	1	---	---	---	---	---	---	---	1	---	---	---
Type of operation not reported	1	---	---	---	---	---	---	---	1	---	---	---
No operation	4	---	---	1	---	---	---	---	2	---	1	---
No report on operation	28	---	---	1	---	1	---	---	12	---	12	2

---

[1] According to the Manual of the International List of Causes of Death, 1920.

[2] Includes laparotomies for drainage of peritonitis, salpingectomies, appendectomies, enterostomies, etc.

TABLE XVI.—*Type of operation for delivery in each trimester of pregnancy among women dying from puerperal causes in each State included in the study*

Type of operation for delivery	Women dying from puerperal causes														
	Alabama	California	Kentucky	Maryland	Michigan	Minnesota	Nebraska	New Hampshire	North Dakota	Oklahoma	Oregon	Rhode Island	Virginia	Washington	Wisconsin
All deaths	**1,118**	**493**	**645**	**382**	**1,312**	**491**	**329**	**109**	**159**	**300**	**177**	**165**	**767**	**316**	**617**
FIRST TRIMESTER															
Total	*114*	*84*	*105*	*76*	*290*	*95*	*72*	*22*	*32*	*55*	*32*	*36*	*104*	*96*	*86*
Therapeutic abortion	4	6	8	7	9	12	3	6	5	2	3	5	3	8	3
Laparotomy for ectopic gestation	5	15	11	7	37	20	10	3	5	3	9	4	12	14	15
No operation	105	63	86	61	244	63	59	13	22	50	20	27	89	74	68
No report on operation				1											
SECOND TRIMESTER															
Total	*91*	*41*	*82*	*31*	*117*	*35*	*39*	*8*	*14*	*28*	*22*	*13*	*68*	*34*	*49*
Therapeutic abortion	13	9	9	6	22	14	6	2	2	7	3	1	7	5	11
Laparotomy for ectopic gestation		1	1		3		1	1						3	3
Other operation	3	2		1	7	1			2		2		3	1	2
No operation	74	29	72	24	85	19	32	5	10	20	17	12	58	25	32
No report on operation	1					1				1					1
FIRST OR SECOND TRIMESTER, PERIOD NOT SPECIFIED															
Total	*37*	*58*	*23*	*20*	*95*	*24*	*18*		*7*	*24*	*27*	*3*	*28*	*16*	*30*
Therapeutic abortion			1		2						1				
Laparotomy for ectopic gestation		3			6						1		2		
No operation	37	55	22	20	85	22	18		7	23	24	3	26	16	29
No report on operation					2	2				1	1				1

LAST TRIMESTER

Total	*859*	*310*	*428*	*255*	*809*	*334*	*200*	*79*	*106*	*190*	*96*	*113*	*566*	*169*	*451*
Forceps:															
Only	80	33	40	18	101	31	19	10	16	19	16	18	41	16	60
With dilatation of cervix	14	1	14	6	26	7	4	8	2	2	7	3	26	11	19
With manual removal of placenta	1	5	4	1	5	2	1			1			2		2
With dilatation of cervix and manual removal of placenta			4		2					1			1	1	3
With other operation	2	2		2	3		1						3		1
Cesarean section:															
Only	46	70	19	36	86	16	31	7	2	12	10	8	42	25	59
Following other operation	10	2	7	7	9	3		2		3	1	1	7	2	8
Version:															
Only	38	10	18	10	30	22	7	6	7	12	4	3	30	7	14
With dilatation of cervix	29	10	14	8	32	30	12	5	3	4	3	9	38	3	24
With dilatation of cervix and manual removal of placenta	1	1	2	7	9	1		1		1		1	9	2	13
With manual removal of placenta	2	2	5	6	3	1			1	1			2		3
With forceps	5	4	3		11	4	8		1	3		6	11	1	7
With dilatation of cervix and forceps		2	1	2	1	1	8		1				2		3
With forceps and manual removal of placenta				3	2	1							2		2
With dilatation of cervix, forceps, and manual removal of placenta					2								1		
With other operation	2				1				1						
Dilatation of cervix:															
Only	12	11	12	8	14	7	8	1		3	5	4	9	9	5
With manual removal of placenta		1	1								1				1
Manual removal of placenta	11	8	5	11	10	6	6		1	1	3	1	11	2	11
Craniotomy or embryotomy following other operation	9	1	5	5	15	4	1	2		1		2	6	2	4
Breech extraction:															
Only	9	6	2		16	2			1	1			2		3
With dilatation of cervix and/or manual removal of placenta	4	1			6	5			1					2	4
Laparotomy for ectopic gestation	1	2	3		1								1		
Other single operations	2	1	1	1		1					1		3		2
Other operations of more than 1 type	1		1	1	1	1	1						2		
Type of operation not reported	1	1	1		1					1			2		2
No operation	538	131	260	120	396	183	86	36	67	113	45	53	311	81	187
No report on operation	41	5	6	3	26	6	7	1	2	11		4	2	5	14

TRIMESTER NOT REPORTED

Total	*17*		*7*		*1*	*3*				*3*			*1*	*1*	*1*
No operation	2		6		1										1
No report on operation	15		1			3				3			1	1	

TABLE XVII.—*Live births, and deaths and mortality rate following abortions among white and colored women and women dying in urban and rural areas in each State included in the study*

State, area, and color	Live births[1]	Deaths following abortion	
		Number	Rate per 10,000 live births
Total	**1,176,603**	**1,825**	**15.5**
Urban	461,150	993	21.5
Rural	715,453	832	11.6
White	1,056,063	1,568	14.8
Colored	120,540	257	21.3
Alabama	*130,985*	*194*	*14.8*
Urban	22,859	69	30.2
Rural	108,126	125	11.6
White	85,010	107	12.6
Colored	45,975	87	18.9
California	*83,536*	*134*	*16.0*
Urban	48,559	90	18.5
Rural	34,977	44	12.6
White	78,700	126	16.0
Colored	4,836	8	16.5
Kentucky	*121,798*	*167*	*13.7*
Urban	22,866	44	19.2
Rural	98,932	123	12.4
White	114,077	138	12.1
Colored	7,721	29	37.6
Maryland	*64,311*	*105*	*16.3*
Urban	36,486	76	20.8
Rural	27,825	29	10.4
White	51,172	84	16.4
Colored	13,139	21	16.0
Michigan	*197,975*	*389*	*19.6*
Urban	120,214	291	24.2
Rural	77,761	98	12.6
White	191,460	369	19.3
Colored	6,515	20	30.7
Minnesota	*100,422*	*112*	*11.2*
Urban	38,290	66	17.2
Rural	62,132	46	7.4
White	99,366	109	11.0
Colored	1,056	3	28.4
Nebraska	*55,893*	*97*	*17.4*
Urban	13,638	48	35.2
Rural	42,255	49	11.6
White	55,144	95	17.2
Colored	749	2	([2])
New Hampshire	*17,474*	*21*	*12.0*
Urban	9,095	6	6.6
Rural	8,379	15	17.9
White	17,459	21	12.0
Colored	15		
North Dakota	*29,673*	*42*	*14.2*
Urban	3,954	12	30.3
Rural	25,719	30	11.7
White	29,300	42	14.3
Colored	373		
Oklahoma	*42,986*	*93*	*21.6*
Urban	8,393	32	38.1
Rural	34,593	61	17.6
White	40,457	76	18.8
Colored	2,529	17	67.2
Oregon	*28,658*	*60*	*20.9*
Urban	11,687	25	21.4
Rural	16,971	35	20.6
White	28,012	59	21.1
Colored	646	1	([2])
Rhode Island	*26,747*	*38*	*14.2*
Urban	23,031	35	15.2
Rural	3,716	3	8.1
White	26,274	37	14.1
Colored	473	1	([2])
Virginia	*114,701*	*143*	*12.5*
Urban	25,205	74	29.4
Rural	89,496	69	7.7
White	80,833	82	10.1
Colored	33,868	61	18.0
Washington	*46,476*	*118*	*25.4*
Urban	24,368	72	29.5
Rural	22,108	46	20.8
White	44,609	112	25.1
Colored	1,867	6	32.1
Wisconsin	*114,968*	*112*	*9.7*
Urban	52,505	53	10.1
Rural	62,463	59	9.4
White	114,190	111	9.7
Colored	778	1	([2])

---

[1] U.S. Bureau of the Census.

[2] Not shown because number of colored births was less than 1,000.

TABLE XVIII.—*Number and percentage of white and colored women and women in urban and rural areas whose deaths followed abortion of each specified type and whose deaths did not follow abortion among women dying from puerperal causes in each State included in the study*

State	Women dying from puerperal causes														
	Total	Report on abortion													No report on abortion
		Total	Total abortions		Spontaneous abortions		Therapeutic abortions		Induced abortions		Type of abortion not reported		No abortion		
			Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]	
Total	**7,380**	**7,346**	**1,825**	**25**	**589**	**8**	**205**	**3**	**794**	**11**	**237**	**3**	**5,521**	**75**	**34**
Urban	*3,462*	*3,455*	*993*	*29*	*274*	*8*	*103*	*3*	*488*	*14*	*128*	*4*	*2,462*	*71*	*7*
White	2,951	2,948	878	30	227	8	99	3	458	16	94	3	2,070	70	3
Colored	511	507	115	23	47	9	4	2	30	6	34	7	392	77	4
Rural	*3,918*	*3,891*	*832*	*21*	*315*	*8*	*102*	*3*	*306*	*8*	*109*	*3*	*3,059*	*79*	*27*
White	3,121	3,105	690	22	247	8	90	3	271	9	82	3	2,415	78	16
Colored	797	786	142	18	68	9	12	2	35	4	27	3	644	82	11
Alabama	**1,118**	**1,102**	**194**	**18**	**107**	**10**	**17**	**2**	**33**	**3**	**37**	**3**	**908**	**82**	**16**
Urban	*293*	*291*	*69*	*24*	*34*	*12*	*3*	*1*	*12*	*4*	*20*	*7*	*222*	*76*	*2*
White	146	145	39	27	19	13	2	1	9	6	9	6	106	73	1
Colored	147	146	30	21	15	10	1	1	3	2	11	8	116	79	1
Rural	*825*	*811*	*125*	*15*	*73*	*9*	*14*	*2*	*21*	*3*	*17*	*2*	*686*	*85*	*14*
White	431	426	68	16	41	10	7	2	12	3	8	2	358	84	5
Colored	394	385	57	15	32	8	7	2	9	2	9	2	328	85	9
California	**493**	**493**	**134**	**27**	**32**	**6**	**15**	**3**	**70**	**14**	**17**	**3**	**359**	**73**	----
Urban	*298*	*298*	*90*	*30*	*22*	*7*	*5*	*2*	*51*	*17*	*12*	*4*	*208*	*70*	----
White	276	276	84	30	20	7	5	2	50	18	9	3	192	70	----
Colored	22	22	6	----	2	----	----	----	1	----	3	----	16	----	----
Rural	*195*	*195*	*44*	*23*	*10*	*5*	*10*	*5*	*19*	*10*	*5*	*3*	*151*	*77*	----
White	183	183	42	23	10	5	9	5	19	10	4	2	141	77	----
Colored	12	12	2	----	----	----	1	----	----	----	1	----	10	----	----
Kentucky	**645**	**639**	**167**	**26**	**63**	**10**	**18**	**3**	**60**	**9**	**26**	**4**	**472**	**74**	**6**
Urban	*153*	*151*	*44*	*29*	*15*	*10*	*7*	*5*	*17*	*11*	*5*	*3*	*107*	*71*	*2*
White	124	123	38	31	13	11	7	6	14	11	4	3	85	69	1
Colored	29	28	6	----	2	----	----	----	3	----	1	----	22	----	1
Rural	*492*	*488*	*123*	*25*	*48*	*10*	*11*	*2*	*43*	*9*	*21*	*4*	*365*	*75*	*4*
White	436	432	100	23	40	9	10	2	36	8	14	3	332	77	4
Colored	56	56	23	41	8	14	1	2	7	13	7	13	33	59	----
Maryland	**382**	**382**	**105**	**27**	**25**	**7**	**13**	**3**	**49**	**13**	**18**	**5**	**277**	**73**	----
Urban	*257*	*257*	*76*	*30*	*16*	*6*	*8*	*3*	*40*	*16*	*12*	*5*	*181*	*70*	----
White	196	196	66	34	13	7	8	4	35	18	10	5	130	66	----
Colored	61	61	10	16	3	5	----	----	5	8	2	3	51	84	----
Rural	*125*	*125*	*29*	*23*	*9*	*7*	*5*	*4*	*9*	*7*	*6*	*5*	*96*	*77*	----
White	77	77	18	23	5	6	3	4	6	8	4	5	59	77	----
Colored	48	48	11	----	4	----	2	----	3	----	2	----	37	----	----

[1] Not shown where number of women was less than 50.

TABLE XVIII.—*Number and percentage of white and colored women and women in urban and rural areas whose deaths followed abortion of each specified type and whose deaths did not follow abortion among women dying from puerperal causes in each State included in the study*—Continued

State	Women dying from puerperal causes															
		Report on abortion														No report on abortion
			Total abortions		Spontaneous abortions		Therapeutic abortions		Induced abortions		Type of abortion not reported		No abortion			
	Total	Total	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
Michigan	**1,312**	**1,309**	**389**	**30**	**108**	**8**	**33**	**3**	**203**	**16**	**45**	**3**	**920**	**70**		**3**
Urban	*922*	*921*	*291*	*32*	*79*	*9*	*24*	*3*	*155*	*17*	*33*	*4*	*630*	*68*		*1*
White	852	852	272	32	71	8	23	3	151	18	27	3	580	68		----
Colored	70	69	19	28	8	12	1	1	4	6	6	9	50	72		1
Rural	*390*	*388*	*98*	*25*	*29*	*7*	*9*	*2*	*48*	*12*	*12*	*3*	*290*	*75*		*2*
White	383	382	97	25	29	8	9	2	48	13	11	3	285	75		1
Colored	7	6	1	----	----	----	----	----	----	----	1	----	5	----		1
Minnesota	**491**	**488**	**112**	**23**	**31**	**6**	**26**	**5**	**45**	**9**	**10**	**2**	**376**	**77**		**3**
Urban	*225*	*225*	*66*	*29*	*19*	*8*	*17*	*8*	*27*	*12*	*3*	*1*	*159*	*71*		----
White	222	222	65	29	19	9	17	8	27	12	2	1	157	71		----
Colored	3	3	1	----	----	----	----	----	----	----	1	----	2	----		----
Rural	*266*	*263*	*46*	*17*	*12*	*5*	*9*	*3*	*18*	*7*	*7*	*3*	*217*	*83*		*3*
White	259	256	44	17	12	5	9	4	17	7	6	2	212	83		3
Colored	7	7	2	----	----	----	----	----	1	----	1	----	5	----		----
Nebraska	**329**	**329**	**97**	**29**	**28**	**9**	**9**	**3**	**52**	**16**	**8**	**2**	**232**	**71**		----
Urban	*123*	*123*	*48*	*39*	*12*	*10*	*3*	*2*	*32*	*26*	*1*	*1*	*75*	*61*		----
White	118	118	46	39	11	9	3	3	32	27	----	----	72	61		----
Colored	5	5	2	----	1	----	----	----	----	----	1	----	3	----		----
Rural	*206*	*206*	*49*	*24*	*16*	*8*	*6*	*3*	*20*	*10*	*7*	*3*	*157*	*76*		----
White	199	199	49	25	16	8	6	3	20	10	7	4	150	75		----
Colored	7	7	----	----	----	----	----	----	----	----	----	----	7	----		----
New Hampshire	**109**	**109**	**21**	**19**	**6**	**6**	**8**	**7**	**6**	**6**	**1**	**1**	**88**	**81**		----
Urban (white)	*54*	*54*	*6*	*11*	*4*	*7*	*1*	*2*	----	----	*1*	*2*	*48*	*89*		----
Rural (white)	*55*	*55*	*15*	*27*	*2*	*4*	*7*	*13*	*6*	*11*	----	----	*40*	*73*		----
North Dakota	**159**	**159**	**42**	**26**	**16**	**10**	**7**	**4**	**18**	**11**	**1**	**1**	**117**	**74**		----
Urban (white)	*31*	*31*	*12*	----	*2*	----	*5*	----	*4*	----	*1*	----	*19*	----		----
Rural	*128*	*128*	*30*	*23*	*14*	*11*	*2*	*2*	*14*	*11*	----	----	*98*	*77*		----
White	124	124	30	24	14	11	2	2	14	11	----	----	94	76		----
Colored	4	4	----	----	----	----	----	----	----	----	----	----	4	----		----
Oklahoma	**300**	**297**	**93**	**31**	**33**	**11**	**9**	**3**	**37**	**12**	**14**	**5**	**204**	**69**		**3**
Urban	*93*	*92*	*32*	*35*	*10*	*11*	*3*	*3*	*14*	*15*	*5*	*5*	*60*	*65*		*1*
White	80	80	28	35	9	11	3	4	12	15	4	5	52	65		----
Colored	13	12	4	----	1	----	----	----	2	----	1	----	8	----		1
Rural	*207*	*205*	*61*	*30*	*23*	*11*	*6*	*3*	*23*	*11*	*9*	*4*	*144*	*70*		*2*
White	170	168	48	29	17	10	6	4	19	11	6	4	120	71		2
Colored	37	37	13	----	6	----	----	----	4	----	3	----	24	----		----

TABLE XVIII.—*Number and percentage of white and colored women and women in urban and rural areas whose deaths followed abortion of each specified type and whose deaths did not follow abortion among women dying from puerperal causes in each State included in the study*—Continued

State	Women dying from puerperal causes															
	Total	Report on abortion														No report on abortion
		Total	Total abortions		Spontaneous abortions		Therapeutic abortions		Induced abortions		Type of abortion not reported		No abortion		
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Oregon	**177**	**177**	**60**	**34**	**11**	**6**	**7**	**4**	**27**	**15**	**15**	**8**	**117**	**66**	----
Urban	*81*	*81*	*25*	*31*	*5*	*6*	*2*	*2*	*14*	*17*	*4*	*5*	*56*	*69*	----
White	79	79	24	30	4	5	2	3	14	18	4	5	55	70	----
Colored	2	2	1	----	1	----	----	----	----	----	----	----	1	----	----
Rural (white)	*96*	*96*	*35*	*36*	*6*	*6*	*5*	*5*	*13*	*1*	*11*	*11*	*61*	*64*	----
Rhode Island	**165**	**165**	**38**	**23**	**11**	**7**	**6**	**4**	**19**	**12**	**2**	**1**	**127**	**77**	----
Urban	*157*	*157*	*35*	*22*	*10*	*.6*	*6*	*4*	*17*	*11*	*2*	*1*	*122*	*78*	----
White	152	152	35	23	10	7	6	4	17	11	2	1	117	77	----
Colored	5	5	----	----	----	----	----	----	----	----	----	----	5	----	----
Rural	*8*	*8*	*3*	----	*1*	----	----	----	*2*	----	----	----	*5*	----	----
White	7	7	2	----	----	----	----	----	2	----	----	----	5	----	----
Colored	1	1	1	----	1	----	----	----	----	----	----	----	----	----	----
Virginia	**767**	**766**	**143**	**19**	**48**	**6**	**10**	**1**	**61**	**8**	**24**	**3**	**623**	**81**	**1**
Urban	*276*	*276*	*74*	*27*	*19*	*7*	*5*	*2*	*33*	*12*	*17*	*6*	*202*	*73*	----
White	138	138	41	30	6	4	3	2	22	16	10	7	97	70	----
Colored	138	138	33	24	13	9	2	1	11	8	7	5	105	76	----
Rural	*491*	*490*	*69*	*14*	*29*	*6*	*5*	*1*	*28*	*6*	*7*	*1*	*421*	*86*	*1*
White	288	288	41	14	15	5	4	1	18	6	4	1	247	86	----
Colored	203	202	28	14	14	7	1	(2)	10	5	3	1	174	86	1
Washington	**316**	**315**	**118**	**37**	**28**	**9**	**13**	**4**	**71**	**23**	**6**	**2**	**197**	**63**	**1**
Urban	*183*	*182*	*72*	*40*	*13*	*7*	*7*	*4*	*47*	*26*	*5*	*3*	*110*	*60*	*1*
White	170	169	69	41	12	7	7	4	46	27	4	2	100	59	1
Colored	13	13	3	----	1	----	----	----	1	----	1	----	10	----	----
Rural	*133*	*133*	*46*	*35*	*15*	*11*	*6*	*5*	*24*	*18*	*1*	*1*	*87*	*65*	----
White	121	121	43	36	13	11	6	5	23	19	1	1	78	64	----
Colored	12	12	3	----	2	----	----	----	1	----	----	----	9	----	----
Wisconsin	**617**	**616**	**112**	**18**	**42**	**7**	**14**	**2**	**43**	**7**	**13**	**2**	**504**	**82**	**1**
Urban	*316*	*316*	*53*	*17*	*14*	*4*	*7*	*2*	*25*	*8*	*7*	*2*	*263*	*83*	----
White	313	313	53	17	14	4	7	2	25	8	7	2	260	83	----
Colored	3	3	----	----	----	----	----	----	----	----	----	----	3	----	----
Rural	*301*	*300*	*59*	*20*	*28*	*9*	*7*	*2*	*18*	*6*	*6*	*2*	*241*	*80*	*1*
White	292	291	58	20	27	9	7	2	18	6	6	2	233	80	1
Colored	9	9	1	----	1	----	----	----	----	----	----	----	8	----	----

---

[2] Less than 1 percent.

APPENDIX B.—THE 1929 REVISION OF THE INTERNATIONAL LIST OF CAUSES OF DEATH

The fourth decennial revision of the International List of Causes of Death was made by the international commission in 1929. The revised list [1] was first used by the United States Bureau of the Census in tabulating the deaths of 1930. The Manual of Joint Causes of Death [2] was published in 1933.

In the 1929 revision of the international list the group "Diseases of pregnancy, childbirth, and the puerperal state" includes the titles no. 140 to no. 150. These titles and their relation to similar titles in the 1920 list are as follows:

140. Abortion with septic conditions	Part of former no. 146 *Puerperal septicemia.*
141. Abortion without mention of septic condition (to include hemorrhages).	Part of former no. 143 *Accidents of pregnancy.* Includes all of no. 143a *Abortion,* part of no. 143c *Others under this title,* such as *antepartum hemorrhage, hemorrhagic mole.*
142. Ectopic gestation:	
(a) With septic conditions specified.	Part of former no. 146 *Puerperal septicemia.*
(b) Without mention of septic conditions.	Part of former no. 143 *Accidents of pregnancy.* Includes all of no. 143b *Ectopic gestation* and no. 143c *Others under this title, cornual pregnancy.*
143. Other accidents of pregnancy (not to include hemorrhages).	Part of former no. 143c *Accidents of pregnancy: Others under this title.* Includes *hydatid mole, dead fetus in uterus, pregnancy* [not otherwise described], etc.
144. Puerperal hemorrhage	All of former no. 144 *Puerperal hemorrhage.*
(a) Placenta previa	All of former no. 144a *Placenta previa.*
(b) Other puerperal hemorrhages.	All of former no. 144b. [*Vicious insertion of placenta,* formerly no. 144a, is now assigned to the less definite no. 144b.]
145. Puerperal septicemia (not specified as due to abortion):	
(a) Puerperal septicemia and pyemia.	Part of former no. 146 *Puerperal septicemia.* Includes all except parts assigned to new no. 140 and new no. 142.
(b) Puerperal tetanus	Part of former no. 148 *Puerperal albuminuria and convulsions.* Includes only part certified as *puerperal tetanus.*

---

[1] Manual of the International List of Causes of Death, 1929. U.S. Bureau of the Census. Washington, 1931.

[2] Manual of Joint Causes of Death Showing Assignment to the Preferred Title of the International List of Causes of Death When Two Causes Are Simultaneously Reported. U.S. Bureau of the Census. Washington, 1933.

146. Puerperal albuminuria and eclampsia.	Part of former no. 148 *Puerperal albuminuria and convulsions.* Includes all former no. 148 except *tetanus* which is assigned to new no. 145, and *toxemia of pregnancy* and *puerperal coma* which are assigned to new no. 147.
147. Other toxemias of pregnancy	Part of former no. 143c *Accidents of pregnancy: Others under this title.* Includes *chorea of pregnancy, pernicious vomiting*, etc. Part of former no. 148 *Puerperal albuminuria and convulsions* such as *toxemia of pregnancy.*
148. Puerperal phlegmasia alba dolens, embolus, sudden death (not specified as septic).	All of former no. 147 *Puerperal phlegmasia alba dolens, embolus, sudden death.*
149. Other accidents of childbirth	Former no. 145 *Other accidents of labor.*
(a) Cesarean section	All of former no. 145a *Cesarean section.*
(b) Others under this title	All of former no. 145b *Other surgical operations and instrumental delivery;* all of former no. 145c *Others under this title;* part of former no. 149 *Following childbirth (not otherwise defined): result of labor without further explanation.*
(1) Rupture of the uterus or bladder during parturition.	
(2) Obstetric operations, difficult labor, abnormal presentation.	
(3) Lacerations of cervix or perineum, postpuerperal shock, labor (unqualified), and similar terms.	
150. Other and unspecified conditions of the puerperal state.	Part of former no. 149 *Following childbirth (not otherwise defined): puerperium* [not described], *puerperal insanity;* all of former no. 150 *Puerperal diseases of the breast.*

The chief differences between the 1920 and 1929 revisions are as follows:

1. *Puerperal septicemia* (no. 146) of the 1920 revision is divided in the 1929 revision into *Abortion with septic conditions* (no. 140), *Ectopic gestation with septic conditions specified* (no. 142a), and *Puerperal septicemia (not specified as due to abortion)* (no. 145).

2. *Puerperal albuminuria and convulsions* (no. 148) in the 1920 revision becomes *Puerperal albuminuria and eclampsia* (no. 146) and *Other toxemias of pregnancy* (no. 147). In *Other toxemias of pregnancy* are included *chorea of pregnancy* and *pernicious vomiting* from the former *Accidents of pregnancy: Others under this title* (no. 143c).

3. *Accidents of pregnancy* (no. 143) of the 1920 revision is subdivided as follows in the 1929 revision:

Abortion (no. 143a) becomes *Abortion without mention of septic conditions (to include hemorrhages)* (no. 141).

Ectopic gestation (no. 143b) becomes *Ectopic gestation: Without mention of septic conditions* (no. 142b).

Others under this title (no. 143c) becomes *Other accidents of pregnancy (not to include hemorrhages)* (no. 143) except that *antepartum hemorrhage* now goes to no. 141, *chorea* and *pernicious vomiting of pregnancy* now go to no. 147, and *cornual pregnancy* now goes to no. 142b.

The rules governing the classification of joint causes of death as given on page 6 apply to the 1929 as well as to the 1920 revision of the international list.

An approximate classification, according to the 1929 revision, of the 7,380 deaths included in the study is given below. The deaths were not reclassified individually, but were shifted as accurately as possible in groups.

1929 revision	Number	Percent distribution
All causes	7, 380	100
140. Abortion with septic conditions	1, 324	18
141. Abortion without mention of septic conditions (to include hemorrhages)	328	4
142. Ectopic gestation	314	4
(a) With septic conditions specified	65	1
(b) Without mention of septic conditions	249	3
143. Other accidents of pregnancy (not to include hemorrhages)	56	1
144. Puerperal hemorrhage	791	11
(a) Placenta previa	347	5
(b) Other puerperal hemorrhages	444	6
145. Puerperal septicemia (not specified as due to abortion)	1, 559	21
146. Puerperal albuminuria and eclampsia	1, 770	24
147. Other toxemias of pregnancy	221	3
148. Puerperal phlegmasia alba dolens, embolus, sudden death (not specified as septic)	339	5
149. Other accidents of childbirth	652	9
(a) Cesarean operation	136	2
(b) Others under this title	516	7
150. Other and unspecified conditions of the puerperal state	26	(1)

1920 revision	Number	Percent distribution
All causes	7, 380	100
143. Accidents of pregnancy	719	10
(a) Abortion	353	5
(b) Ectopic gestation	248	3
(c) Others under this title	118	2
144. Puerperal hemorrhage	791	11
(a) Placenta previa	347	5
(b) Other puerperal hemorrhage	444	6
145. Other accidents of labor	652	9
(a) Cesarean section	136	2
(b) Other surgical operations and instrumental delivery	109	1
(c) Others under this title	407	6
146. Puerperal septicemia	2, 948	40
147. Puerperal phlegmasia alba dolens, embolus, sudden death	344	5
148. Puerperal albuminuria and convulsions	1, 900	26
149. Following childbirth (not otherwise defined)	23	(1)
150. Puerperal diseases of the breast	3	(1)

---

(1) Less than 1 percent.

The most important change made under the 1929 revision is the division of *Puerperal septicemia* (former no. 146) into *Abortion with septic conditions* (new no. 140), *Ectopic gestation with septic conditions specified* (new no. 142a), and *Puerperal septicemia not specified as due to abortion* (new no. 145). In the present study of the 2,948 deaths attributed after interview to *Puerperal septicemia* 1,324 would be assigned under the 1929 revision to *Abortion with septic conditions*, 65 to *Ectopic gestation with septic conditions specified*, and 1,559 to *Puerperal septicemia not specified as due to abortion*, the latter including 17 deaths from sepsis for which there was no information regarding abortion.

Examination of the death certificates of the 1,324 deaths that would have been assigned after interview to *Abortion with septic conditions* (new no. 140) shows that the information regarding the occurrence of abortion was frequently missing on the original certificate as was also the presence of sepsis. A summary of the information shown on these death certificates follows:

	Number	Percent distribution
Total	1, 324	100
Evidence of sepsis on death certificate	1, 242	94
Evidence of abortion on death certificate	977	74
No evidence of abortion on death certificate	265	20
No evidence of sepsis on death certificate	82	6
Evidence of abortion and so assigned	41	3
Evidence of abortion, assigned to other causes	29	2
No evidence of abortion (assigned to other causes)	12	1

Of these 1,324 deaths that would have been assigned after interview to *Abortion with septic conditions* had the 1929 classification been used, only 977 (74 percent) would have been so assigned had only the death-certificate information been available. Most of the remaining deaths (20 percent) would have been assigned to *Puerperal septicemia not specified as due to abortion.* Three percent would have been assigned to *Abortion without mention of septic conditions* (no. 141), and 3 percent to other puerperal causes.

The deaths included in the present study were, of course, certified in 1927 and 1928 when the 1920 revision was in use. The presence of these new titles in the 1929 classification will unquestionably stimulate more complete reporting with regard to sepsis and abortion on certificates of women dying from causes associated with pregnancy and childbirth. It will take some time, however, for the medical profession to become fully accustomed to the use of these titles in the 1929 revision. It will also require much work on the part of bureaus of vital statistics before completeness is attained.

In the next few years changes will undoubtedly appear in the proportion of deaths and the mortality rates from these causes, but these changes will be at least partially attributable to improvement in certification. Care must be used in their interpretation.

The figures for the birth registration area for 1930 and 1931, according to the 1929 revision, are given below:

Cause of death	1930		1931	
	Number	Percent distribution	Number	Percent distribution
All causes	14,836	100	13,964	100
140. Abortion with septic conditions	1,961	13	2,049	15
141. Abortion without mention of septic conditions (to include hemorrhages)	671	5	653	5
142. Ectopic gestation	595	4	588	4
(a) With septic conditions specified	103	1	109	1
(b) Without mention of septic conditions	492	3	479	3
143. Other accidents of pregnancy (not to include hemorrhages)	169	1	88	1
144. Puerperal hemorrhage	1,523	10	1,442	10
(a) Placenta previa	546	4	475	3
(b) Other puerperal hemorrhages	977	7	967	7
145. Puerperal septicemia (not specified as due to abortion)	3,321	22	3,149	23
(a) Puerperal septicemia and pyemia	3,303	22	3,137	22
(b) Puerperal tetanus	18	(1)	12	(1)
146. Puerperal albuminuria and eclampsia	3,589	24	3,027	22
147. Other toxemias of pregnancy	493	3	529	4
148. Puerperal phlegmasia alba dolens, embolus, sudden death (not specified as septic)	702	5	630	5
149. Other accidents of childbirth	1,767	12	1,755	13
(a) Cesarean operation	436	3	430	3
(b) Others under this title	1,331	9	1,325	9
150. Other and unspecified conditions of the puerperal state	45	(1)	54	(1)

[1] Less than 1 percent.

When comparing these figures with those in the table on page 214, it must be remembered that the 1930 and 1931 figures are compiled from death certificates while those on page 214 are from classifications made after interview with the attending physician.

23. PRENATAL CARE Given by

24. Summary: Adequate, inadequate, none

25. Physical exam. during preg., N.

(a) Heart, N. Normal, abnormal (spec.)

(b) Lungs, N. Normal, abnormal (spec.)

(c) Measurements, N. Ex., int.) Normal, abn. (spec.)

(d) Wassermann, N. Neg. Pos.

26. Visits:

	Month of pregnancy											
	1	2	3	4	5	6	7	8	9			
									1	2	3	4
(a) Saw patient, N.												
(b) Urine exam., N.												
(c) Abdom. exam., N.												
(d) Blood pressure, N.												

27. Complications of pregnancy. None. N. R.

28. Albuminuria. N. Began wk.

29. Convulsions, N. Began wk.

30. High blood pressure, N. (a) (spec.) (b) Began wk.

31. Oedema, N. (spec. : Began wk.

32. Prolonged headache. N. Dur wks.

33. Pernicious vomiting of pregnancy, N. (a) Began wk. (b) Dur. wks.

34. Bleeding during pregnancy. N. (a) Began wk. (b) Recurred. Daily. wk., mo., irreg., N. (c) Scanty, mod., profuse.

35. Treatment by phys. N.

36. Intercurrent diseases. N.

37. Delivery: None.

38. Attdt.: Phys., interne, student, mwf., other, none.

39. Technique of phys.: (a) Vaginal exam., N. Number (b) Rectal exam., N. (c) Rubber gloves, N.

(d) Other

40. Presentation: Normal, face, breech, transverse.

41. Membranes: Rupt., N. (a) Spon., art. (b) How long before del.?

42. Labor: (a) Hrs. (b) Type (c) Onset: None, spon., art. (spec.)

(d) Termination: None, spon., art. (See Inq. 47)

43. Pituitrin, N. (a) Stage (b) Dosage

44. Tears, N. (a) Perineal, N., degree. (b) Cervical, N. (c) Repaired, N.

45. Third stage: Normal, abnorm. (spec.)

46. Postpartum hemorrhage, N. Amount of blood lost

47. Operative delivery, N. (spec.)

(a) Delivery unassisted, assisted by

(b) Anesthetic (spec.) given by attend., assistant

(c) Patient shaved, N.

(d) Sterile goods, N.

(e) Preparation method

48. Abortion: (a) Spontaneous, self-induced. (b) Hemor., N. (c) Temp., N. (d) Curettage, N.; temp. before, N.

(e) Therapeutic abortion. Consultation, N.; Cause of

49. Maternal history

No.	Per. gest.	Live or still.	Comp. of preg.	Delivery
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Hospital case: 50. Delivered in hospital, N. Planned, emergency.

51. Entered hosp.: Before del.: Dur. del.: After del., days.

52. In hospital days.

53. (Septic case) (a) Other in hosp. at time, N. (b) Developed in hosp., N.

54. Hospital equipment: (a) Maternity service, N.

(b) Delivery room, N. (c) Training school, N.

55. Supervision adequate, N. (a) No. nurses (b) No. beds

56. Standing of hospital: (a) Listed A. M. A., N. (b) App. A. C. S., N. (c) 1, N.; 2, N.; 3, N.; 4, N.; 5, N.

Remarks

57. Hospital technique: (a) Obstet., 1, 2, 3, 4, 5. (b) Other

58. Medical history:

(a) Heart

(b) Kidneys

(c) Scarlet fever, N. (d) Other

59. (a) Distance from phys. or hospital (b) Method of transportation

(c) Medical attention, none, in extremis

60. Operation preceded death, N. (If other than shown in Inq. 47 specify)

These [illegible] are reserved for office use

PRIMARY CAUSE OF DEATH (Check section corresponding to cause of death)

143. ACCIDENTS OF PREGNANCY

1. Abortion. (Enter details in Inq. 48

2. Pernicious vomiting of pregnancy. (a) Duration before phys. called weeks.

(b) Condition when first seen (c) Operation, N. Refused by patient, N.

3. Ectopic gestation: (a) Sympt. began week

(b) Duration (c) Operation. Emergency. Elective (Enter details in Inq. 47)

4. Other causes under 143, remarks.

144. PUERPERAL HEMORRHAGE

1. Placenta praevia (a) Amount of blood lost (b) Method of delivery

2. Postpartum hemorrhage, N. (a) Delivery: Normal, operative (Enter in Inq. 47) (b) Abnormalities (spec.)

(c) Management of third stage

(d) Left patient hrs. after delivery. (e) Con. satisfactory, with dropping pulse, N. (f) Inspection of placenta at delivery, N.

3. Other causes under 144, remarks

145. OTHER ACCIDENTS OF LABOR

1. Cesarean section: (a) Indications for

(b) Elective, emergency. (c) Vaginal exam. immediately before, N.

(d) Patient in labor, N. Duration, hrs. (e) Type of labor

(f) Temperature (g) Rup. membranes, N. hours

2. Instrumental delivery and other operative procedures (Enter details in Inq. 47)

3. Other causes under 145, remarks:

146. PUERPERAL SEPTICEMIA

1. Operative delivery (Enter in Inq. 47) 2. Nonoperative: (a) Shaved, N. (b) Scrubbed with soap and water; antiseptic (spec.)

3. Care after delivery: (a) First call hrs., days after (b) Nursing care

4. Symptoms appeared hrs. after delivery. 5. Intrauterine manipulation, N. Before symptoms, after symptoms

6. Treatment

147. PUERPERAL PHLEGMASIA ALBA DOLENS, EMBOLUS, SUDDEN DEATH

1. Embolus: (a) Phlebitis, N. (b) Respiratory distress, N. (c) Cyanosis, N.

(d) Operative delivery, N. (Enter in Inq. 47) (e) Death during delivery, N. hrs. after 2. Autopsy, N.

3. Other causes under 147, remarks

APPENDIX C.—SCHEDULE USED IN THE STUDY

C. B. 122—Revised

U. S. DEPARTMENT OF LABOR
CHILDREN'S BUREAU

S. No. _____

MOTHER (information from death certificate)

1. PLACE OF DEATH—

County _____ State _____ Registered No. _____
Township _____ or Village _____ or
City _____ No. _____ St., _____ Ward
(If death occurred in a hospital or institution, give its NAME instead of street and number)

2. FULL NAME _____

(a) Residence. No. _____ St., _____ Ward. _____
(Usual place of abode) (If nonresident give city or town and State)

Length of residence in city or town where death occurred _____ yrs. _____ mos. _____ days. How long in U. S., if of foreign birth? _____ yrs. _____ mos. _____ days.

PERSONAL AND STATISTICAL PARTICULARS

3. SEX	4. COLOR OR RACE	5. SINGLE, MARRIED, WIDOWED, OR DIVORCED (write the word)

5a. If married, widowed, or divorced WIFE of _____

6. DATE OF BIRTH (month, day, and year) _____

7. AGE Years	Months	Days	If LESS than 1 day, _____ hrs. or _____ min.

8. OCCUPATION OF DECEASED

(a) Trade, profession, or particular kind of work _____

(b) General nature of industry, business, or establishment in which employed (or employer) _____

(c) Name of employer _____

9. BIRTHPLACE (city or town) _____
(State or country)

10. INTERVAL BETWEEN BIRTH AND MOTHER'S DEATH _____

14. NO BIRTH CERTIFICATE: (a) Not required. (b) Required but not registered

Date of search _____

MEDICAL CERTIFICATE OF DEATH

11. DATE OF DEATH (month, day, and year) _____, 19___

12.

I HEREBY CERTIFY, That I attended deceased from _____, 19___, to _____, 19___

that I last saw h___ alive on _____, 19___

and that death occurred, on the date stated above, at _____ m.

The CAUSE OF DEATH was as follows:

_____ (duration) _____ yrs. _____ mos. _____ days

CONTRIBUTORY _____
(Secondary)

_____ (duration) _____ yrs. _____ mos. _____ days

13. Where was disease contracted if not at place of death? _____

Did an operation precede death? _____ Date of _____

Was there an autopsy? _____

What test confirmed diagnosis? _____

(Signed) _____, M. D.

_____, 19___ (Address) _____

Reserve this space	International code

BABY (information from birth certificate)

15. PLACE OF BIRTH—

County _____ State _____
Township _____ or Village _____
City _____ No. _____ St., _____ Ward
(If birth occurred in a hospital or institution, give its NAME instead of street and number)

16. Full name of child _____ (If child is not yet named, make supplemental report, as directed)

17. Sex of child	To be answered ONLY in event of plural births.	18. Twin, triplet, or other _____ 19. Number, in order of birth _____	20. Legitimate?	21. Date of birth _____ (Month, day, year)

22. Number of children of this mother (Taken as of time of birth of child herein certified and including this child) (a) Born alive and now living _____ (b) Born alive but now dead _____ (c) Stillborn _____

CERTIFICATE OF ATTENDING PHYSICIAN OR MIDWIFE*

I hereby certify that I attended the birth of this child, who was _____ at _____ m. on the date above stated.
(Born alive or stillborn)

Signature _____
(Physician or midwife)

* When there was no attending physician or midwife, then the father, householder, etc., should make this return. A stillborn child is one that neither breathes nor shows other evidence of life after birth.

182748°—33. (Face p. 216.)

---

148. PUERPERAL ALBUMINURIA AND CONVULSIONS

(See Prenatal care) (a) Medical supervision before convulsions, N. Dr. (b) Condition when first seen

(c) Symptoms began before death: Convulsions began before death

(d) Cooperation by patient, good, poor (e) Bed at first symptoms, N.

(f) Hospital, N. at first symptoms, when in serious condition

149. CAUSES FOLLOWING CHILDBIRTH (n. o. s.)

150. PUERPERAL DISEASES OF THE BREAST

151. Contributory causes of death (given on death cert.; not given on death cert.)

Notes:

Informant Agent Date of visit

INDEX

- **Abdominal** pregnancy, 69, 77, 78, 178. *See also* Ectopic gestation.
- Abnormal or difficult labor, classification in international list, 5. *See also* Labor, long or difficult, as indication for Cesarean section.
- Abnormal presentation as indication for Cesarean section, **90–92**, 97, 100, 102.
- Abnormal presentation, rupture of uterus, 168.
- Abortion, 103–115. *See also* Abortion or premature labor as cause of death.
  - Age of woman, 111.
  - Autopsy, 14, 15.
  - Blood transfusion, 79, 107.
  - Classification of deaths by cause, 5–10, 103–106. *See also* 79, 113, 114, 116–117, 155, 212–215.
  - Colored and white women, 83–86, **112**, 129, 131, **208, 209–211.**
  - Comment and recommendations by advisory committee, 38, 39, 88, **113–115, 133, 180–182.**
  - Criminal, 6, 16, 41, **103–104,** 114. *See also* 80 *and* Abortion—Induced.
  - Curettage, 79, 80, **107–110**, 114, 115, 133.
  - Definition, 5, 103, 113.
  - Gestation period by month, 106–107, 114.
  - Gestation period by trimester, 79, 81–82, 84–86, 104, 114.
  - Hemorrhage, 79, 106, **108**, 110, 114. *See also* Abortion—Puerperal hemorrhage.
  - Hospitalization, 25, 26, 127–128.
  - Incidence among maternal deaths, 103, 209–211.
  - Induced, 14, 37–38, 80, 81–82, 103–115, 116–118, 131–132, 136, 178, 209–211. *See also* 23, 41, 47, 143.
  - Operation for delivery. *See* Therapeutic abortion.
  - Operation other than for delivery, 79, 80, **107**, 108, 109, 110.
  - Parity, 34, 35, 111–112. *See also* 178.
  - Pernicious vomiting of pregnancy, 79, 108, 114, 153.
  - Placenta previa, 79, 104, 105, 108. *See also* Abortion—Puerperal hemorrhage.
  - Puerperal albuminuria and convulsions, 103, 104, 105, 143. *See also* 79, 196–197.
  - Puerperal hemorrhage, 104, 105, 155. *See also* Abortion—Hemorrhage.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 104, 105, 136. *See also* 103.
  - Puerperal septicemia, 23, 47, 79, 103, 104, **105–106**, 108, 109, 110, 114, 116, 117, 118, 129, 131–132, 133, 212–215. *See also* 115, 153, 178.
  - Rate, maternal mortality, 112, 131–132, 208.
  - Rural and urban areas, 23, 38, **112**, 129, 208, 209–211. *See also* 19.
  - Self-induced, 41, 103–104, 114. *See also* Abortion—Induced.
- Abortion—Continued.
  - Septic. *See* Abortion—Puerperal septicemia.
  - Spontaneous, 14, **104–115**, 117, 132, 136, 209–211. *See also* 143, 153, 180, 182.
  - States, 113, 131–132, 206–207, 208, 209–211.
  - Therapeutic, 78, 79, 83–86, 88, 89, **105–114**, 117, 118, 132, 136, 153, 196–197, 206–207, 209–211. *See also* 88, 127, 143.
  - Unmarried and married women, 37–38, 39, 108, 114.
- Abortion or premature labor as cause of death. *See also* Accidents of pregnancy as cause of death.
  - Accessibility of physician, 24.
  - Age of woman, 192–194.
  - Autopsy, 14.
  - Classification of deaths by cause, 5–10, 13, 103, 105. *See also* 79, 113–114, 116, 139, 141, 155, 167, 212–215.
  - Colored and white women, 17, 183–185.
  - Deaths following abortion, 103, 104, 105.
  - Definition, 5, 103. *See also* 113.
  - Gestation period by trimester, 29, 183–185, 204–205.
  - Intercurrent disease, 166–167.
  - Interval between termination of pregnancy and death, 28, 190.
  - Operation other than for delivery, 204–205.
  - Parity, 191, 192–194.
  - Rate, maternal mortality, 8.
  - Rural and urban areas, 19, 183–185. *See also* 24.
- Abscess, cerebral, 101 (footnote), 102 (footnote).
- Abscess, incision and drainage, 77, 79, 80, 107, 118, 119, 120, 177, 204–205.
- Abscess, pelvic, nonpuerperal cause of death, 15.
- Accessibility of physician, 22–24.
  - Comment and recommendations by advisory committee, 38, 39, 98, 164.
  - *See also* 11, 25, 59, 159, 176.
- Accident (not puerperal) as cause of death, 6.
- Accidental hemorrhage, classification in international list, 5. *See also* Premature separation of placenta.
- Accidents of labor. *See* "Other accidents of labor" as cause of death.
- Accidents of pregnancy as cause of death. *See also* Abortion or premature labor as cause of death, Ectopic gestation as cause of death, *and* "Other accidents of pregnancy" as cause of death.
  - Abortion, deaths following, 104–105.
  - Accessibility of physician, 24.
  - Age of woman, 192–194.
  - Autopsy, 14.
  - Cesarean section, 101.
  - Classification of deaths, 5–13, 135, 139–141, 167, 172. *See also* 103, 155, 212–215.

Accidents of pregnancy as cause of death—Contd.
Colored and white women, 17, 183–185, 199–203.
Gestation period by trimester, 29, 46, 104, 183–185.
Live births and stillbirths, 33, 34.
Operation for delivery, 68, 196–197.
Parity, 191, 192–194.
Pernicious vomiting of pregnancy, 139, 152.
Prenatal care, 46–48.
Rate, maternal mortality, 8, 29.
Rural and urban areas, 19, 183–185.
Unmarried and married women, 36.
Accouchement forcé, 88, 146, 154. *See also* Dilatation of cervix, artificial.
Acute infectious diseases, 6, 15, 122, 166–167, 181. *See also* Hospital standards and facilities.
Acute nephritis, 101, 139.
Acute yellow atrophy of liver, 140.
Adhesions, hysterectomy for, 78, 177.
Age of woman, 35–36, 192–194.
Abortion, 111.
Abortion or premature labor as cause of death, 192–194.
Causes of death (table), 192–194.
Cesarean section, 70–71, 92–94. *See also* 90–91, 98–100.
Colored and white women, 35–36.
Ectopic gestation, 174–175.
Operation for delivery, 69–71. *See also* Age of woman—Cesarean section.
Parity, 69–71, 92–94, 150, 155–156, 175, 192–194. *See also* 90–91.
Puerperal albuminuria and convulsions, 150, 192–194.
Puerperal hemorrhage, 155–156, 163, 192–194.
Rate, maternal mortality, 35–36.
Unmarried and married women, 36–37.
Alabama:
Abortion, 113, 131–132, 208, 209–211. *See also* 206–207.
Accessibility of physician, 24. *See also* 25, 137.
Attendant at confinement, 57, 58, 59.
Cesarean section, 97, 206–207.
Colored and white women, 16, 30, 51, 131, 150–151, 157, 158, 173, 208, 209–211.
Ectopic gestation, 172, 173, 174.
Gestation period by trimester, 28, 30, 31, 130, 131, 206–207.
Hospitalization, 21, 27, 174.
Live births, 30, 31, 208.
Medical attention, 24, 25, 137. *See also* 57, 58, 59.
Midwives, 57, 58, 59.
Operations, 84, 87, 97, 206–207.
"Other accidents of labor", 137.
Prenatal care, 50, 51, 52–53, 54.
Puerperal albuminuria and convulsions, 54, 150–151.
Puerperal hemorrhage, 157, 158.
Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
Puerperal septicemia, 130, 131–132.
Rate, maternal mortality, 30, 31.
Rural and urban areas, 21, 24, 31, 52–53, 130, 151, 158, 172, 208, 209–211. *See also* 28.
See also 1–2.
Albuminuria and convulsions. *See* Puerperal albuminuria and convulsions.
American College of Surgeons, 1, 182, 186–189.
American Journal of Obstetrics and Gynecology, 1 (footnote).
American Medical Association, 27, 186–187. *See also* 11.
American Public Health Association, definition of live births and stillbirths, 3.
Anemia as nonpuerperal contributory cause, 167. *See also* Hemorrhage.
Anesthesia:
Cesarean section, 96–97, 99, 100, 101 (footnote), 102 (footnote).
Eclampsia, 154.
See also 181.
Antepartum hemorrhage, classification in international list, 5, 212, 213.
Antiseptics, 127. *See also* Technique of physician (asepsis).
Appendectomy, 77, 78–79, 80, 88, 118, 177–179, 204–205.
Appendicitis as cause of death, 15.
Asepsis. *See* Technique of physician (asepsis).
Attendant at confinement, 55–64. *See also* Delivery care.
Cesarean section, 95, 101.
Comment and recommendations by advisory committee, 63–64, 87–88, 133, 180–182.
Puerperal septicemia, 122–128, 133. *See also* 60–61.
Technique, 56, 60–62, 64, 73–74, 123–127.
See also 3–4, 41–42, 98, 162, 167.
Autogenous infection. *See* Endogenous infection.
Autopsy, 14–15.
Comment and recommendations by advisory committee, 38, 170, 178, 180.
Ectopic gestation, 173, 178.
Inversion of uterus, 169.
Puerperal phlegmasia alba dolens, embolus, sudden death, 135, 136. *See also* 14.
Rupture of uterus, 167–168. *See also* 170.
See also 9.

Bag. *See* Dilatation of cervix, artificial.
Bag of waters. *See* Membranes, rupture.
Baltimore, births to nonresidents in hospitals, 20.
Banti's disease, 91.
Birth certificate, facing 216. *See also* 1, 3, 25, 38, 108.
Birth-registration area, 1, 2, 3, 32, 38. *See also* 6 (footnote).
Births. *See* Live births *and* Stillbirths.
Births, Stillbirths, and Infant Mortality Statistics, 1928 (U.S. Bureau of the Census publication), 32 (footnote).
Bladder, rupture, 5, 166.
Blood count, 43 (footnote).
Blood pressure, 3, 43, 45, 141, 154.
Blood test. *See* Wassermann test.
Blood transfusion, 76, 77, 80, 181, 204–205.
Abortion, 79, 107.
Cesarean section, 98, 164.
Comment and recommendations by advisory committee, 88, 98, 164–165, 178, 181.
Ectopic gestation, 78–79, 88, 177–178.
Puerperal hemorrhage, 160, 162, 163, 164, 204–205.
Puerperal septicemia, 118, 120–121, 204–205.
Board of health, State. *See* State board or department of health.
Bougie. *See* Dilatation of cervix, artificial.
Braxton Hicks version, 160, 164.

- Breast. *See* Puerperal diseases of the breast as cause of death.
- Breech extraction, 67, 69, 70, 72, 73, 120, 196–197, 198, 206–207.
- Breech presentation, 90, 91, 168. *See also* Abnormal presentation as indication for Cesarean section.
- Bronchopneumonia, 167. *See also* Pneumonia.

- **California:**
  - Abortion, 113, 131–132, 208, 209–211. *See also* 206–207.
  - Attendant at confinement, 58.
  - Cesarean section, 97, 206–207.
  - Colored and white women, 16, 30, 51, 131, 150–151, 157, 158, 173, 208, 209–211.
  - Ectopic gestation, 172, 173, 174.
  - Foreign-born and native women, 17.
  - Gestation period by trimester, 30, 31, 130, 131, 206–207.
  - Hospitalization, 21, 27, 174.
  - Legitimacy not reported, 38, 108.
  - Live births, 17, 30, 31, 208.
  - Medical attention, 25, 137. *See also* 58.
  - Midwives, 58.
  - Operations, 84, 87, 97, 206–207.
  - "Other accidents of labor", 137.
  - Prenatal care, 51, 52–53, 54.
  - Puerperal albuminuria and convulsions, 54, 150–151.
  - Puerperal hemorrhage, 157, 158.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  - Puerperal septicemia, 130, 131–132.
  - Rate, maternal mortality, 30, 31.
  - Rural and urban areas, 19, 21, 31, 52–53, 130, 151, 158, 172, 173, 208, 209–211.
  - *See also* 1–2.
- Cancer, 6.
- Cardiac disease, 6, 15, 89, 91, 100, 102, 167. *See also* 90, 101.
- Case histories:
  - Cesarean section, 98–100.
  - Embolism, 135, 136.
  - Puerperal hemorrhage, 164, 165.
  - Rupture of uterus, 169–170.
- Causes of death (tables) in relation to—
  - Abortion, 104, 105.
  - Accessibility of physician, 24.
  - Age of woman, 192–194.
  - Cesarean section, 101.
  - Colored and white women, 17, 183-185, 199-201, 202-203.
  - Death certificate, 8, 10, 13.
  - Gestation period by trimester, 18, 28, 29, 46, 183–185, 196–197, 199–201, 202–203, 204–205.
  - Interval between delivery and death, 28, 190.
  - Live births and stillbirths, 34.
  - Onset of labor, 199–201.
  - Operation for delivery, 196–197.
  - Operation other than for delivery, 204–205.
  - Parity, 191, 192–194.
  - Pernicious vomiting of pregnancy, 152.
  - Prenatal care, 46.
  - Rate, maternal mortality, 8.
  - Rural and urban areas, 19, 183–185.
  - Termination of labor, 202–203.
- Causes of death (tables) in relation to—Continued.
  - Undelivered cases, 34.
  - Unmarried and married women, 36.
- Census, United States Bureau of:
  - Classification of colored and white races, 2 (footnote).
  - Classification of deaths by cause, 2, 5–10, 15, 38, 45, 103, 114, 116-117, 139-141, 155, 212-215. *See also* 135, 166, 172.
  - Classification of live births and stillbirths, 3 (footnote), 32.
  - Classification of rural and urban areas, 2 (footnote).
  - Information on illegitimate births, 108.
  - *See also* 4, 17, 25, 30, 31, 34, 208.
- Cephalic version, 68 (footnote).
- Cerebral hemorrhage, 101 (footnote), 102 (footnote), 167.
- Cerebral thrombosis, 135.
- Certificate, birth, facing 216. *See also* 1, 3, 25, 38, 108.
- Certificate, death, 8, 10–13, 15–16, 34, 38, 180, 214, facing 216. *See also* 1–16, 100, *and specific causes of death.*
- Cervical Cesarean section, 101. *See also* 89.
- Cervix:
  - Dilatation. *See* Dilatation of cervix, artificial.
  - Laceration, 5, 160, 162, 164. *See also* 78, 80, 118, 119.
  - Packing, 76–77, 80, 107, 118, 119, 120, 204–205. *See also* Uterus, packing.
  - Scarred or rigid, 91.
  - Trachelorrhaphy, 78, 80, 118.
- Cesarean section, 89–102. *See also* Cesarean section as cause of death.
  - Abnormal presentation, 90–92, 97, 100, 102.
  - Age of woman, 70–71, 92–94. *See also* 90–91, 98–100.
  - Anesthesia, 96–97, 99, 100, 101 (footnote), 102 (footnote).
  - Appendectomy with, 77.
  - Before last trimester, 78, 89.
  - Cervical, 101. *See also* 89.
  - Classification of deaths by cause, 5–10, 89, 100–101, 197. *See also* 135, 136, 139–140, 166, 212–215.
  - Colored and white women, 83–86, 91–92, 97–98.
  - Comment and recommendations by advisory committee, 88, 98–102, 154, 164–165, 170, 180–181.
  - Contracted pelvis, 89–92, 96, 97, 98–102.
  - Definition, 89.
  - Difficult or long labor, 89–92, 96, 97, 99–102.
  - Eclampsia, 89–92, 94, 96, 97, 98–102, 154. *See also* Cesarean section—Puerperal albuminuria and convulsions.
  - Embolism, 89, 101–102, 135–136.
  - Emergency or planned, 94, 99, 101.
  - Following attempt at other operation, 68, 88, 94, 100, 101, 196–197.
  - Gestation period by trimester, 84–86, 97. *See also* 78, 89.
  - Hours in labor, 72, 94.
  - Immediate cause of death, 89, 100–102.
  - Incidence, 65, 67, 83, 84–86, 97.
  - Indications, 89–92, 94, 96, 97, 98–102.
  - Live births and stillbirths, 89, 96. *See also* 98, 100.
  - Onset and termination of labor, 74–76, 199–203.

- Cesarean section—Continued.
  - With operation other than for delivery, 77.
  - Parity, 69–72, 92–94, 98–102, 198. *See also* 167.
  - Placenta, premature separation, **90–92**, 94, 96, 97, **102**, 163.
  - Placenta previa, 89–92, 94, 96, 97, **98**, **102**, 160, 164–165.
  - Porro operation, 77, 101. *See also* 89.
  - Preeclampsia, 89–92, 94, 96, 97, 98–102, 154.
  - Puerperal albuminuria and convulsions, 89, 94, 95, 99, 101, 146, 148, 154. *See also* Cesarean section—Eclampsia.
  - Puerperal hemorrhage, 89, 94, 101, 161. *See also* Cesarean section—Placenta previa *and* Premature separation of placenta.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 89, 101. *See also* 136.
  - Puerperal septicemia, 89, 94, 95, 98–102, 116, 117, 120, 196–197.
  - Rupture of membranes, 94.
  - Rupture of uterus, **90–92**, 96, 97, **102**, **167–168**, 170.
  - Rural and urban areas, 83–86, 91–92, 98.
  - States, 97, 206–207.
  - Technique of operator (asepsis), 73, 95.
  - Types, 77, 89, 98–101.
- Cesarean section as cause of death. *See also* "Other accidents of labor" as cause of death.
  - Accessibility of physician, 24.
  - Age of woman, 192–194.
  - Cesarean section, deaths following, 101, 196–197.
  - Classification of deaths, 5–10, 13, 89. *See also* 100, 101, 136, 139–140, **166**, 212–215.
  - Colored and white women, 17, 183–185, 199–201, 202–203.
  - Gestation period by trimester, 29, 183–185, 196–197, 199–201, 202–203, 204–205.
  - Interval between delivery and death, 28, 190.
  - Live births and stillbirths, 34.
  - Onset and termination of labor, 199–203.
  - Operation other than for delivery, 204–205.
  - Parity, 191, 192–194.
  - Rate, maternal mortality, 8.
  - Rural and urban areas, 19, 183–185.
- Children's Bureau, United States, plan for study of maternal mortality, 1–4. *See also* 43.
- Chloroform, 96–97, 100, 154.
- Chorea of pregnancy, 5, 7, 91. *See also* 213.
- Chronic nephritis. *See* Nephritis.
- Cities. *See* Rural and urban areas.
- Classification of deaths by cause, 5–10. *See also* 212–215 *and specific causes of death.*
- Colored and white women, 2, **16**, 17, 18, 38, **183–185**.
  - Abortion, deaths following, 83–86, **112**, 129, 131, 208, **209–211**.
  - Abortion or premature labor as cause of death, 17, 183–185.
  - Accidents of pregnancy as cause of death, 17, 183–185, 199–201, 202–203.
  - Age of woman, 35–36.
  - Attendant at confinement, 56–60, 124–125.
  - Autopsys, 14.
  - Causes of death (tables), 17, 183–185, 199–201, 202–203.
  - Cesarean section, deaths following, 83–86, 91–92, 97–98.
  - Cesarean section as cause of death, 17, 183–185, 199–201, 202–203.
  - Classification of "colored", 2 (footnote).
  - Comment and recommendations by advisory committee, 38, 64.
  - Delivery care, 55–61, 63, 64, 124–125. *See also* 4, 38.
  - Ectopic gestation, 173.
  - Ectopic gestation as cause of death, 17, 183–185.
  - Gestation period by trimester 18, 26, 30, 37, 84–86, 129, 131, 142, 146, 147, **183–185**, 199–201, 202–203.
  - Hospitalization, 26–27, 55, 63, 64, 146.
  - Live births and stillbirths to women included in study, 32–33.
  - Live births in certain States, 16, 30, 208.
  - Midwives, 4, 56–60, 61, 63–64, 124–125.
  - Onset and termination of labor, 74–75, 82–83, 146–147, 199–203.
  - Operation for delivery, **65**, **66**, 74, 75, 82, 83, 84–86, 199–203. *See also* Colored and white women—Cesarean section.
  - Operation other than for delivery, 65, 66.
  - Parity, 35. *See also* 49.
  - Pituitrin, 63.
  - Placenta previa. *See* Colored and white women—Puerperal hemorrhage.
  - Plural pregnancy, 32, 33.
  - Prenatal care, 37, 41–51, 64, 142, 195.
  - Puerperal albuminuria and convulsions, 16, 17, 18, 59–60, 140–141, 142, 144, 145, 146, 147, 150–151, 183–185, 199–201, 202–203.
  - Puerperal hemorrhage, 17, 18, 157–158, 183–185, 199–201, 202–203.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 16, 17, 18, **138**, 183–185, 199–201, 202–203.
  - Puerperal septicemia, 17, 18, **124–125**, **129–131**, 183–185, 199–201, 202–203.
  - Rate, maternal mortality, **16–18**, 28, **30**, 35–36, 38, 112. *See also specific causes of death.*
  - Rural and urban, 28, 42, **44**, 45, 64, 66, 84–86, 92, 98, 129, 138, 140–141, 144–145, 157, **183–185**, **209–211**.
  - States, 2, 16, 28, 30, 51, 131, 150–151, 157, 158, 173, 208, 209–211.
  - Undelivered cases, 32–34, 74–75, 199–203.
  - Unmarried women, 36–38, 195.
  - Wassermann test, 44, 45.
- Colpotomy, posterior, 79, 80, 119. *See also* Abscess, incision and drainage.
- Comment and recommendations by advisory committee:
  - Abortion, 113–115, 180, 181, 182. *See also* 38–39, 88, 133.
  - Anesthesia, 100, 154, 181. *See also* 98, 99, 101, 102.
  - Autopsy, 38, 180. *See also* 170, 178.
  - Blood transfusion, 88, 98, 164–165, 178, 181.
  - Cesarean section, 98–102, 181. *See also* 88, 154, 164–165, 170, 180.
  - Curettage, 88, 114–115, 133. *See also* 181.
  - Death certificates, 38, 180. *See also* 114, 178.
  - Ectopic gestation, 178–179. *See also* 88.

Comment and recommendations by advisory committee—Continued.
  Examinations, rectal and vaginal, 64, 98, 101, 133, 164, 181.
  General considerations (section), 38–39.
  Hospitalization, 38–39, 64, 133, 182. *See also* 100, 164, 165, 178.
  Maternal care, 63–64, 180–182. *See also* 38–39, 87–88, 98–102, 133–134, 153–154, 163–165, 170–171, 178–179.
  Obstetric education, 87–88, 133, 181–182. *See also* 100, 154, 165, 170.
  Operation for delivery other than Cesarean section, 87–88. *See also* 114, 133–134, 138, 154, 164–165, 170, 178, 181.
  Pituitrin, 64, 165, 170, 171, 181.
  Puerperal hemorrhage, 163–165, 181. *See also* 39, 64, 87, 98, 101–102, 114.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 101, 138.
  Puerperal septicemia, 133–134. *See also* 39, 64, 87, 88, 98–102, 114–115, 164–165, 178–179, 181, 182.
  Recommendations by advisory committee (section), 180–182.
  Rupture of uterus, 170–171, 181. *See also* 64, 102, 164.
  Technique of physician (asepsis), 64, 87, 88, 101, 114, 133–134, 164–165, 178, 181.
  Toxemias of pregnancy, 153–154. *See also* 39, 64, 87, 99–102, 181.
Confinement, attendant at. *See* Attendant at confinement.
Contagious diseases. *See* Infectious diseases.
Contributory causes of death, 5–10, 15, 116, 135–136, 139–141, 151–152, 155, 166–167, 170, 172.
Convulsions. *See* Eclampsia *and* Puerperal albuminuria and convulsions.
Cord, prolapsed, as indication for Cesarean section, 91.
Cornual pregnancy, 5, 172. *See also* 212–213.
Coronary thrombosis, 135.
Coroner, signature on death certificate, 9, 11–14, 34, 38, 138.
Craniotomy or embryotomy, **67–69**, 70, 72, 73, 84–86, 88, 120, 168, **196–197**, 206–207.
Credé, modified, postpartum hemorrhage, 162.
Criminal abortion, 6, 16, 41, **103–104**, 114. *See also* Abortion—Induced.
Cul-de-sac puncture for hematocele, 177.
Curettage, 76–80, 204–205.
  Abortion, 79–80, 107–110, 114–115, 133.
  Blood transfusion, 76–79, 107, 118, 120, 204–205.
  Comment and recommendations by advisory committee, 88, 114–115, 133.
  Ectopic gestation, 78–79, 177, 178, 204–205.
  Febrile cases, 88, 108–110, 114, 133.
  Puerperal septicemia as cause of death, 77, 88, 108–110, 114–115, 118–120, 133, 204–205.
Cyanosis associated with embolism, 135–136.

Dead-born issue. *See* Stillbirths.
Dead fetus, indication for therapeutic abortion, 108.
Death before delivery, 32–34, 49–50, 67–69, 74–75, 79, 80–83, 121, 146–149, 161, 163, 199–203. *See also* 39.
Death certificate, 8, **10**, **13**, 15–16, 34, 38, 138, 180 214, facing 216. *See also* 1–16, 100, *and specific causes of death.*
Delivery, attendant at. *See* Attendant at confinement.
Delivery care, 40, 55–63, 64, 73–74, 87–88, 122–128, 133, 162, 180–182. *See also* 3–4, 39, 41–42, 95–98, 169, Hospitalization, Medical attention, *and* Operation for delivery.
Delivery and death, interval between, **27–28**, 128, 137, 148–149, 161, 162, 190. *See also* 164.
Delivery in hospital. *See* Hospitalization.
Delivery, operative. *See* Operation for delivery.
Delivery, postmortem, puerperal albuminuria and convulsions, 148.
Department of health, State. *See* State board or department of health.
Diabetes, 6, 91.
Difficult or long labor as indication for Cesarean section, 89–92, 96, 97, 99–102.
Dilatation of cervix, artificial, 67, 69, **196–197**.
  Accouchement forcé, 88, 146, 154.
  Age of woman, 70.
  Comment and recommendations by advisory committee, 88, 164.
  Ectopic gestation, 177.
  Forceps, 67, 68, 72, 73, 78, 88, 120, 148, 160, 163, 168, 169, 196–197, 198, 206–207.
  Hours in labor, 70, 71–72.
  Parity, 69, 70, 71, 72, 198.
  Puerperal albuminuria and convulsions, 148.
  Puerperal hemorrhage, 160, 163.
  Puerperal septicemia, 120.
  States, 207.
  Version, 67, 68, 69, 72, 73, 78, 88, 120, 148, 160, 163, 168, 169, 196–197, 198, 206–207.
  See also Cervix, packing.
Diphtheria, 6.
Disease, intercurrent, 40, 122, 166–167. *See also* 41–42.
Distance of patient from physician. *See* Accessibility of physician.
Disproportion as indication for Cesarean section, 89–92, 96, 97, 102.
Drainage. *See* Incision and drainage for infection.
Dry labor, 91. *See also* Membranes, rupture.
Duration of labor. *See* Labor, duration.
Duration of pregnancy. *See* Gestation period by month *and* Gestation period by trimester.
Dyspnea associated with embolism, 135–136.
Dystocia. *See* Long or difficult labor as indication for Cesarean section.

Eclampsia. *See also* Puerperal albuminuria and convulsions *and* Toxemias of pregnancy.
  Cesarean section, 89–92, 94, 96, 97, 98–102, 154.
  Classification of deaths by cause, 5–10, 139, 212–215.
  Comment and recommendations by advisory committee, 87, 98–102, 153, 154.
  See also 48, 87, 119.
Ectopic gestation, 172–179. *See also* Ectopic gestation as cause of death.
  Age of woman, 174–175.
  Appendectomy, 79, 88, 177, 178–179.

- Ectopic gestation—Continued.
  - Blood transfusion, 78–79, 88, 177–178.
  - Classification of deaths by cause, 5–10, 172, 212–215. *See also* 103, 139, 155.
  - Colored and white women, 173.
  - Comment and recommendations by advisory committee, 88, 178–179.
  - Last trimester of pregnancy, 69, 77, 176, 178.
  - Medical attention, 13, 173–174 ,178.
  - Operation for ectopic gestation, 67, 69, 77, 78–79, 83–86, 88, 118, 173, 176–177, 178, 196–197, 198, 206–207.
  - Operation other than for ectopic gestation, 78–79, 88, 177–178, 204–205.
  - Parity, 174–175, 178.
  - Puerperal albuminuria and convulsions as contributory cause, 141, 172.
  - Puerperal septicemia, 88, 116, 117, 118, 172, 178, 179.
  - Rate, maternal mortality, 172–173.
  - Rural and urban areas, 24, 83, 172–173, 178.
  - States, 172–174.
- Ectopic gestation as cause of death. *See also* Accidents of pregnancy as cause of death.
  - Accessibility of physician, 24.
  - Age of woman, 192–194.
  - Classification of deaths by cause, 5–10, 13, 172. *See also* 103, 139, 155, 212–215.
  - Colored and white women, 17, 183–185.
  - Gestation period by trimester, 29, 183–185, 204–205.
  - Interval between delivery and death, 28, 190.
  - Operation for ectopic gestation, 196–197.
  - Operation other than for ectopic gestation, 204–205.
  - Parity, 191, 192–194.
  - Rate, maternal mortality, 8.
  - Rural and urban areas, 19, 183–185. *See also* 24.
- Embolism, 101–102, 135–136, 166. *See also* Puerperal phlegmasia alba dolens, embolus, sudden death.
- Embryotomy or craniotomy, 67–69, 70, 72, 73, 84–86, 88, 120, 168, 196–197, 198, 206–207.
- Endogenous infection, 134. *See also* 122.
- Enterostomy, 76, 77, 79, 80, 119, 177, 205 (footnote).
- Ether, 96–97, 101 (footnote), 102 (footnote), 154.
- Ethylene, 96–97.
- Examinations:
  - General physical, 43.
  - Laboratory, 3, 43–45, 116 (footnote), 141.
  - Rectal. *See* Rectal examination.
  - Vaginal. *See* Vaginal examination.
- External causes of death, 6.
- External version, 68 (footnote).
- Extrapuerperal causes of death. *See* Nonpuerperal causes of death.
- Extrauterine pregnancy. *See* Ectopic gestation.

- **Failed** forceps, 67, 68, 69, 88.
- Faulty presentation, classification in international list, 5, 166, 212.
- Fetal mortality. *See* Abortion *and* Stillbirths.
- Fetus, previable. *See* Viability of fetus.
- Fetus, undelivered. *See* Undelivered cases.
- Fever. *See also* Puerperal septicemia.
  - Curettage in abortion cases, 88, 108, 109, 110, 114, 133.
  - Segregation of patients, 182, 188 (footnote), 189 (footnote).
- Fibroid tumor:
  - Cesarean section, 90–91.
  - Hysterectomy, 78, 80, 177.
  - Rupture of uterus, 170.
- Following childbirth (not otherwise defined) as cause of death, 5, 10, 13, 17, 19, 24, 29, 34, 36, 46, 183–185, 190, 191, 192–194, 213–214.
- Forceps operation for delivery, 67–73.
  - Age of woman, 70–71.
  - Before last trimester, 78.
  - Classification of deaths by cause, 68, 69, 196–197.
  - Colored and white women, 83–86.
  - Comment and recommendations by advisory committee, 87, 88, 170.
  - Dilatation of cervix, artificial, 67, 68, 72, 73, 78, 88, 120, 148, 160, 163, 168, 169, 196–197, 198, 206–207.
  - Duration of labor, 71–72.
  - Failed forceps, 67, 68, 69, 88.
  - Live births and stillbirths, 73.
  - Manual removal of placenta, 67, 68, 120, 161, 196–197, 198, 206–207.
  - Parity, 70, 71, 72, 198.
  - Placenta previa, 68, 69, 160.
  - Premature separation of placenta, 163.
  - Puerperal albuminuria and convulsions, 68, 69, 148, 196–197.
  - Puerperal hemorrhage, 68, 69, 160, 161, 163, 196–197.
  - Puerperal septicemia, 68, 69, 87, 120, 196–197.
  - Rupture of uterus, 168.
  - Rural and urban areas, 83–86.
  - States, 206–207.
  - Technique of physician, 73, 87.
  - Version, 67, 68, 69, 73, 88, 120, 168, 169, 196–197, 198, 206–207.
- Foreign-born and native women, 16–18.

- **Gestation,** ectopic. *See* Ectopic gestation.
- Gestation period by month:
  - Abortion, 106–107. *See also* 114.
  - Ectopic gestation, 176.
  - Pernicious vomiting of pregnancy, 152.
- Gestation period by trimester:
  - Abortion, 79, 81–82, 84–86, 104. *See also* 114.
  - Autopsy, 14.
  - Causes of death, 18, 28–29, 46, 183–185, 196–197, 199–201, 202–203, 204–205.
  - Cesarean section, 84–86, 97. *See also* 78, 79.
  - Colored and white women, 18, 26, 30, 37, 84–86, 129, 131, 142, 146, 147, 183–185, 199–201, 202–203.
  - Hospitalization, 25–26, 195.
  - Live births and stillbirths, 32–34.
  - Onset and termination of labor, 146–147, 199–203.
  - Operation for delivery, 65–76, 78–83, 84–87, 118–120, 196–197, 206–207. *See also* Cesarean section.
  - Operation other than for delivery, 118–119, 204–205.
  - Prenatal care, 45–48, 142.
  - Rate, maternal mortality, 18, 29, 30, 31,
  - Rural and urban areas, 18, 28, 31, 84–86, 129, 130, 146, 147, 183–185.
  - States, 28, 30–31, 54, 87, 97, 130, 131, 206–207.
  - Unmarried and married women, 36–37, 195.
  - *See also specific causes of death.*
- Gloves, rubber, for vaginal examination, 60, 61, 64, 126–127, 133, 181.

- Gonorrhea, 122.
- Gravidity. *See* Parity.

- **Health,** State board or department. *See* State board or department of health.
- Heart. *See* Cardiac disease.
- Hematocele, cul-de-sac, puncture for, 177.
- Hemorrhage. *See also* Hemorrhage, postpartum, Placenta previa, *and* Puerperal hemorrhage as cause of death.
  - Abortion, 79, 106, 108, 110, 114. *See also* 155.
  - Cesarean section, 90–92, 94, 100, 102, 164–165.
  - Comment and recommendations by advisory committee, 100, 102, 114, 163–164, 181.
  - Ectopic gestation, 79.
  - Puerperal septicemia, 116, 120, 164–165.
- Hemorrhage, cerebral, 101 (footnote), 102 (footnote), 167.
- Hemorrhage, postpartum, 116, 155, 160, 162, 164. *See also* "Other puerperal hemorrhage" as cause of death.
- Hepatitis, chronic, 101, 102.
- Hernia, 15.
- Homicide (criminal abortion), 6, 103–104, 114.
- Hospital standards and facilities, 1, 182, 186–189.
- Hospitalization, 25–27, 55–56, 182, 186–189. *See also* Hospital standards and facilities.
  - Abortion, 25, 26, 127–128.
  - Autopsy, 14.
  - Cesarean section, 94, 100.
  - Colored and white women, 26–27, 55, 63, 64, 146.
  - Comment and recommendations by advisory committee, 38–39, 64, 100, 133, 178, 182.
  - Coroner's signing death certificate in hospital, 11–12, 14.
  - Ectopic gestation, 173–174, 178.
  - Emergency or planned, 25–27, 55, 64, 94, 195.
  - Puerperal albuminuria and convulsions, 145–146.
  - Puerperal septicemia, 123, 127–128, 133.
  - Rural and urban areas, 20–21, 27, 38, 173–174.
  - States, 21, 174.
  - Unmarried women, 37, 195.
  - *See also* 3.
- Hours in labor. *See* Labor, duration.
- Hydatidiform mole, 5, 80 (footnote), 212.
- Hydrocephalus as indication for Cesarean section, 91.
- Hyperemesis gravidarum. *See* Pernicious vomiting of pregnancy.
- Hysterectomy, 77, 78, 79, 80, 107, 118, 120, 177, 204–205.
- Hysterotomy, 79, 89.

- **Ileus,** acute, 89, 101 (footnote), 102 (footnote). *See also* 15, 91, 167, *and* Enterostomy.
- Illegitimacy. *See* Unmarried women.
- Inaccessibility of physician. *See* Accessibility of physician.
- Incision and drainage for infection, 76, 77, 79, 80, 107, 118, 119, 120, 177, 204, 205.
- Induced abortion. *See* Abortion—Induced.
- Induction of labor. *See* Labor, mechanical induction, *and* Labor, medical induction.
- Infectious diseases, 6, 15, 122, 166–167, 181. *See also* Hospital standards and facilities.
- Influenza, 6, 166, 167.
- Insanity, puerperal, 5, 213.
- Instrumental delivery. *See* Forceps operation for delivery *and* "Other surgical operations and instrumental delivery" as cause of death.
- Intercurrent disease, 40, 122, 166–167. *See also* 41–42.
- International Commission for the Revision of the International List of Causes of Death, 7, 212.
- International List of Causes of Death, Manual of:
  - 1920 edition, 5–10, 38, 212–215. *See also* Causes of death (tables).
  - 1929 edition, 212–215.
  - *See also* Joint Causes of Death, Manual of, *and specific causes of death.*
- Internes. *See* Attendant at confinement.
- Interstitial pregnancy. *See* Ectopic gestation.
- Interval between delivery and appearance of symptoms, puerperal septicemia, 119, 121–122.
- Interval between termination of pregnancy and death, 27–28, 128, 137, 148–149, 161, 162, 190. *See also* 164.
- Intestinal obstruction, 15, 91, 167. *See also* 89, 101 (footnote), 102 (footnote), *and* Enterostomy.
- Intrauterine manipulation, 117, 118, 181. *See also* Operation for delivery *and* Operation other than for delivery.
- Inversion of uterus, 5, 76, 77, 166, 169, 171. *See also* 204–205.

- **Joint** Causes of Death, Manual of:
  - 1925 edition, 5, 38, 155.
  - 1933 edition, 212.
  - *See also* International List of Causes of Death Manual of.

- **Kentucky:**
  - Abortion, 113, 131–132, 208, 209–211. *See also* 206–207.
  - Accessibility of physician, 23. *See also* 25, 137.
  - Attendant at confinement, 57, 58, 59.
  - Cesarean section, 97, 206–207.
  - Colored and white women, 16, 30, 51, 131, 150, 157, 158, 173, 208, 209–211.
  - Ectopic gestation, 172, 173, 174.
  - Gestation period by trimester, 30, 31, 130, 131, 206–207.
  - Hospitalization, 21, 174.
  - Live births, 30, 31, 208.
  - Medical attention, 23, 25, 137. *See also* 57, 58, 59.
  - Midwives, 57, 58, 59.
  - Operations, 87, 97, 206–207.
  - "Other accidents of labor", 137.
  - Prenatal care, 51, 52–53, 54.
  - Puerperal albuminuria and convulsions, 54, 150, 151.
  - Puerperal hemorrhage, 157, 158.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  - Puerperal septicemia, 130, 131–132.
  - Rate, maternal mortality, 30, 31.
  - Rural and urban areas, 21, 23, 31, 52–53, 130, 151, 158, 172, 208, 209–211.
  - *See also* 1–2.
- Kidney disease, previous, 149. *See also* Nephritis.

Labor, dry, 91.
Labor, duration, 71–72, 94, 122, 167, 168.
  Comment and recommendations by advisory committee, 88, 98, 133, 165, 170, 181.
Labor, long or difficult, as indication for Cesarean section, 89–92, 96, 97, 98–102, 181.
Labor, mechanical induction, 67–69, 74–75, 80–82, 146, 199, 201. *See also* Dilatation of cervix, artificial.
Labor, medical induction, 69, 74–75, 80–82, 146, 199–201.
Labor, onset and termination (artificial, spontaneous, or none), 74–75, 80–83, 199–203. *See also* Operation for delivery.
  Causes of death (tables), 199–203.
  Colored and white women, 74–75, 82–83, 146–147, 199–203.
  Parity, 75, 76.
  Pernicious vomiting of pregnancy, 153.
  Prenatal care, 76.
  Puerperal albuminuria and convulsions, 146–147, 199–203.
  Puerperal hemorrhage, 161, 199–203.
  Puerperal septicemia, 121, 133, 199–203.
  Trimesters, first two, 78, 79, 80–83, 146–147, 199–203.
  Trimester, last, 67–69, 74–75, 146–147, 199–203.
  With specified operations, 67–69, 78, 79.
  See also 100, 154, 177, *and specific operations.*
Labor (unqualified) as cause of death, classification in international list, 5. *See also* 213.
Laboratory examinations, 3, 43–45, 116 (footnote), 141, 182.
Laceration of cervix or perineum, 5, 15, 78, 118, 160, 162, 164. *See also* 80, 119.
Laparotomy for drainage, 77, 80, 118–119, 204–205.
Laparotomy for ectopic gestation, 67, 69, 77, **78–79,** 83, 84–86, 88, 114, 118, 173, **176–177,** 178, 196–197, 198, 206–207.
Laparotomy other than hysterectomy, 77–78, 79, 80, 107, 118, 120, 177, **204–205.**
Live births, definition by American Public Health Association, 3 (footnote).
Live births in certain States, **3,** 16, 17, 19, **30, 31,** 208.
  Colored and white women, 16, 30, 208.
  Foreign-born women, 17.
  Rural and urban areas, 19, 31, 208.
Live births to women included in study, 32–34. *See also* Stillbirths.
  Before last trimester, **32,** 78, 89, **104,** 118.
  Cesarean section, 89, 96.
  Classified by cause of mother's death, 33, 34.
  Colored and white women, 32–33.
  Comment and recommendations by advisory committee, 39, 64.
  Ectopic gestation, 178.
  Operation for delivery, **73,** 78, 89, 96, 118.
  Pituitrin, 62.
  Postmortem delivery, albuminuria and convulsions, 148.
  Premature separation of placenta, 163. *See also* 96.
  Prenatal care, 49, 50, 64.
  Puerperal albuminuria and convulsions, 33, 34, 148, 149. *See also* 96.
  Puerperal septicemia, 33, 34.
Liver, acute yellow atrophy, 140.
Liver—chronic hepatitis, 101, 102.
Lobar pneumonia, 15, 90. *See also* Pneumonia.
Long or difficult labor as indication for Cesarean section, 89–92, 96, 97, 99–102.

Manipulation, intrauterine, 117–118, 181. *See also* Operation for delivery *and* Operation other than for delivery.
Manipulation, vaginal, 127, 128, 181.
Manual dilatation of cervix. *See* Dilatation of cervix, artificial.
Manual of the International List of Causes of Death. *See* International List of Causes of Death, Manual of.
Manual of Joint Causes of Death. *See* Joint Causes of Death, Manual of.
Marital status. *See* Unmarried women.
Maryland:
  Abortion, 113, 131–132, **208, 209–211.** *See also* 206–207.
  Attendant at confinement, 57, 58, 59.
  Baltimore, nonresidents hospitalized, 20.
  Cesarean section, 97, 206–207.
  Colored and white women, 16, **30,** 51, 131, 150, 151, 158, 173, 208, 209–211.
  Ectopic gestation, 172, 173, 174.
  Foreign-born and native women, 17.
  Gestation period by trimester, **30, 31,** 130, 131, 206–207.
  Hospitalization, 20, 21, 174.
  Live births, 17, 30, 31, 208.
  Medical attention, 25, 137. *See also* 57, 58, 59.
  Midwives, 57, 58, 59.
  Operations, 87, 97, **206–207.**
  "Other accidents of labor", 137.
  Prenatal care, 50, 51, 52–53, 54.
  Puerperal albuminuria and convulsions, 54, 150–151.
  Puerperal hemorrhage, 158.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  Puerperal septicemia, 130, 131–132.
  Rate, maternal mortality, 30, 31.
  Rural and urban areas, 19, 20, 21, **31,** 52–53, 130, 151, 158, 172, **208, 209–211.**
  See also 1–2.
Masks in delivery room, 60 (footnote), 73, 125, 181.
Maternal care 40–64. *See also* Prenatal care, Delivery care, *and* Postpartum care.
Maternal Deaths (United States Children's Bureau Publication No. 221), 1 (footnote).
Maternal Mortality (United States Children's Bureau Publication No. 158), 156 (footnote).
Maternal Mortality, How to Make a Study of (United States Children's Bureau Publication No. 153), 1 (footnote).
Maternal mortality rate. *See* Rate, maternal mortality.
Maternity and Infancy Act, conference of State directors, 1.
Measurements, pelvic, 43, 45, 76, 89–90, 98–99.
Mechanical induction of labor, 67–69, 74–75, 80–82, 146, 199–201. *See also* Dilatation of cervix, artificial.
Medical attention. *See also* Hospitalization, Prenatal Care, *and specific causes of death.*
  Accessibility of physician, 22–24, 38, 39, 164. *See also* 11, 59, 98, 159, 164, 176.

Medical attention—Continued.
  Colored and white women, 26–27, 55–61, 63, 64, 124–125, 143–146. *See also* 4, 38.
  Delivery care, 40, 55–63, 64, 73–74, 87–88, 122–128, 133, 162, 180–182. *See also* 3–4, 39, 95–98.
  States, 25, 137.
  Technique of physician (asepsis), 56, **60–62**, 64, 73–74, 87, 95, 101, 114, **122–128**, 133, 164–165, 181. *See also* 41.
  Unmarried women, 37–38.
  When received, 11–12, 22–25, 37, **38–39**, 59–60, 137, 143–145, 160, 162, 173–174, 178. *See also* 123, 148, 152–153.
Medical education, 87–88, 181, 182. *See also* 100, 133, 154, 165, 170.
Medical induction of labor, 69, 74–75, 80–82, 146, 199–201.
Medical societies, 1, 180, 181. *See also* American Medical Association.
Medical students. *See* Attendant at confinement.
Membranes, rupture, 94, 99, 101, 122, 164. *See also* 91.
Meningitis with cerebral abscess, 101 (footnote).
Mensuration, pelvic, 43, 45, 76, 89–90, 98–99.
Mesenteric thrombosis, 135.
Method of study, 1–4. *See also* 14, facing 216.
Michigan:
  Abortion, 113, 131–132, **208**, **209–211**. *See also* 206–207.
  Attendant at confinement, 57, 58.
  Cesarean section, 97, 206–207.
  Colored and white women, 16, 30, 51, 131, 150, 158, 173, 208, 209–211.
  Ectopic gestation, 172, 173, 174.
  Foreign-born and native women, 17.
  Gestation period by trimester, 30, **31**, 130, 131, 206–207.
  Hospitalization, 21, 174.
  Live births, 17, 30, 31, 208.
  Medical attention, 25, 137. *See also* 57, 58.
  Midwives, 57, 58.
  Operations, 87, 97, **206–207**.
  "Other accidents of labor", 137.
  Prenatal care, 51, 52–53, 54.
  Puerperal albuminuria and convulsions, 54, 150–151.
  Puerperal hemorrhage, 158.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  Puerperal septicemia, 130, 131–132.
  Rate, maternal mortality, 30, 31.
  Rural and urban areas, 19, 21, **31**, 52–53, 130, 151, 158, 172, 208, 209–211.
  See also 1–2.
Midwives, 56–61.
  Comment and recommendations by advisory committee, 64, 133, 182.
  Puerperal septicemia, 122–127, 133. *See also* 73, 98.
  See also 3–4, 95, 169.
Minnesota:
  Abortion, 113, 131–132, **208**, **209–211**. *See also* 206–207.
  Accessibility of physician, 23. *See also* 25, 137.
  Attendant at confinement, 57, 58.
  Cesarean section, 97, 206–207.
  Colored and white women, 208, 209–211.
  Ectopic gestation, 172, 174.
Minnesota—Continued.
  Foreign-born and native women, 17.
  Gestation period by trimester, **31**, 130, 206–207.
  Hospitalization, 21, 174.
  Live births, 17, 31, 208.
  Medical attention, 23, 25, 137. *See also* 57, 58.
  Midwives, 57, 58.
  Operations, 87, 97, **206–207**.
  "Other accidents of labor", 137.
  Prenatal care, 52–53, 54.
  Puerperal albuminuria and convulsions, 54, 151.
  Puerperal hemorrhage, 158.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  Puerperal septicemia, 130, 131–132.
  Rate, maternal mortality, 31.
  Rural and urban areas, 21, 23, **31**, 52–53, 130, 151, 158, 172, 208, 209–211.
  See also 1–2.
Miscarriage. *See* Abortion.
Missed abortion, classification in international list, 5.
"Modified Credé", postpartum hemorrhage, 162.
Moribund patients. *See* Medical attention—When received.
Mortality rate. *See* Rate, maternal mortality.
Multiparae. *See* Parity.
Myocarditis. *See* Cardiac disease.

Native and foreign-born women, 16–18.
Nebraska:
  Abortion, 113, 131–132, 208, **209–211**. *See also* 206–207.
  Accessibility of physician, 23. *See also* 25, 137.
  Attendant at confinement, 58.
  Cesarean section, 97, 206–207.
  Colored and white women, 208, 209–211.
  Ectopic gestation, 172, 174.
  Foreign-born and native women, 17.
  Gestation period by trimester, **31**, 130, 206–207.
  Hospitalization, 21, 174.
  Live births, 17, 31, 208.
  Medical attention, 23, 25, 137. *See also* 58.
  Midwives, 58.
  Operations, 84, 87, 97, **206–207**.
  "Other accidents of labor", 137.
  Prenatal care, 52–53, 54.
  Puerperal albuminuria and convulsions, 54, 151.
  Puerperal hemorrhage, 158.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  Puerperal septicemia, 130, 131–132.
  Rate, maternal mortality, 31.
  Rural and urban areas, 21, 23, **31**, 52–53, 130, 131, 151, 158, 172, 208, 209–211.
  See also 1–2.
Negroes. *See* Colored and white women.
Nephritis:
  Cesarean section, 89, 90, 99, 101, 139–140.
  Classification of deaths by cause, 5, 6, 15, 89, 139–140, 141.
  Comment and recommendations by advisory committee, 99–101.
  Puerperal albuminuria and convulsions, 5, 139, 141, 142, 149.
  Women of child-bearing age, 140.
  See also 149.

New Hampshire:
Abortion, 113, 131, 132, 208, **209–211**. *See also* 206–207,
Accessibility of physician, 23. *See also* 25, 137.
Attendant at confinement, 58.
Cesarean section, 97, 206–207.
Colored and white women, 208, 209–211.
Ectopic gestation, 172, 174.
Foreign-born and native women, 17.
Gestation period by trimester, **31**, 130, 206–207.
Hospitalization, 21, 174.
Live births, 17, 31, 208.
Medical attention, 23, 25, 137. *See also* 58.
Operations, 83–84, 87, 97, **206–207**.
"Other accidents of labor", 137.
Prenatal care, 52–53, 54.
Puerperal albuminuria and convulsions, 54. 150–151.
Puerperal hemorrhage, 158.
Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
Puerperal septicemia, 130, 131, 132.
Rate, maternal mortality, 31.
Rural and urban areas, 19, 21, 23, **31**, 52–53, 130, 150–151, 158, 172, **208**, **209–211**.
See also 1–2.
Nitrous oxide, 96–97, **101** (footnote), 102 (footnote).
Nonmedical attendants. *See* Attendant at confinement.
Nonpuerperal causes of death, 15–16, **38**. *See also* 6–10, 45, 141, 167, 170.
Nonresidents in hospitals. *See* Hospitalization—Rural and urban areas.
Normal deliveries (uncomplicated cases), 40.
North Dakota:
Abortion, 113, 131, 132, 208, **209–211**. *See also* 206–207.
Accessibility of physician, 23. *See also* 25, 137.
Attendant at confinement, 58.
Cesarean section, 97, 206–207.
Colored and white women, 157, 208, 209–211.
Ectopic gestation, 172, 174.
Foreign-born and native women, 17.
Gestation period by trimester, **31**, 130, 206–207.
Hospitalization, 21, 174.
Live births, 17, 31, 208.
Medical attention, 23, 25, 137. *See also* 58.
Midwives, 58.
Operations, 87, 97, **206–207**.
"Other accidents of labor", 137.
Prenatal care, 52–53, 54.
Puerperal albuminuria and convulsions, 54, 151.
Puerperal hemorrhage, 157, 158.
Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
Puerperal septicemia, 130, 131, 132.
Rate, maternal mortality, 31.
Rural and urban areas, 21, 23, **31**, 52–53, 130, 151, 158, 172, 208, 209–211.
See also 1–2.
Number of pregnancies. *See* Parity.
Nursing care, 123, 133, 182. *See also* 40.

Obstetric advisory committee, 1, 2. *See also* Comment and recommendations by advisory committee.
Obstetric education, 87–88, 181–182. *See also* 100, 133, 154, 165, 170.
Occipito-posterior position, 91, 99.
Oklahoma:
Abortion, 113, 131, 132, 208, **209–211**. *See also* 206–207.
Attendant at confinement, 58.
Cesarean section, 97, 206–207.
Colored and white women, 16, **30**, 51, 131, 150, 157, 158, 173, 208, 209–211.
Ectopic gestation, 172, 173, 174.
Gestation period by trimester, **30**, **31**, 130, 131, 206–207.
Hospitalization, 21, 174.
Live births, 30, 31, 208.
Medical attention, 25, 137. *See also* 58.
Midwives, 58.
Operations, 84, 87. 97, **206–207**.
"Other accidents of labor", 137.
Prenatal care, 50, 51, 52–53, 54.
Puerperal albuminuria and convulsions, 54, 150, 151.
Puerperal hemorrhage, 157, 158.
Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
Puerperal septicemia, 130, 131, 132.
Rate, maternal mortality, 30, 31.
Rural and urban areas, 21, **31**, 52–53, 130, 151, 158, 172, 208, **209–211**.
See also 1–2.
Onset of labor. *See* Labor, onset and termination.
Operation for delivery, 65–88, 196–197, 198, 206–207. *See also* Cesarean section *and* Therapeutic abortion.
Age of woman, 69–71.
Breech extraction, 67, 69, 70, 72, 73, 120, 196–197, 198, 206–207.
Causes of death (table), 196–197. *See also* 68–69, 199–203.
Colored and white women, 65–66, 84–86. *See also* 74–75, 82, 83, 199–203.
Comment and recommendations by advisory committee, 87–88, 133, 138, 154, 164–165, 170, 178–179, 181.
Craniotomy or embryotomy, **67–69**, 70, 72, 73, 84–86, 88, 120, 168, 196–197, 198, 206–207.
Dilatation of cervix. *See* Dilatation of cervix, artificial.
Emergency or planned, 76, 87, 178. *See also* 154, 164.
Forceps. *See* Forceps operation for delivery.
Gestation period by trimester, 65–76, 78–83, 84–87, 118–120, **196–197**, **206–207**. *See also* 199–203.
Hours in labor, 71–72.
Hysterotomy, 79, 89.
Inversion of uterus, 169, 204–205.
Laparotomy for ectopic gestation, 67, 69, 77, 78–79, 83–86, 88, 118, **176–177**, 178, 196–197, 198, 206–207. *See also* 173.
Live births and stillbirths, 73. *See also* 78, 118.
Parity, 69–72, 76, 198. *See also* 154.
Placenta, manual removal, 67–70, 72, 73, 120, 161, 169, 196–197, 198, 206–207. *See also* 65, 88.
Placenta, premature separation, 163, 165.
Placenta previa, 160, 164. *See also* 119.
Placenta previa as cause of death, 68, 69, 196–197. *See also* 199–203.

Operation for delivery—Continued.
  Prenatal care, 76, 87.
  Puerperal albuminuria and convulsions, 68, 69, 119, 148, 196–197. *See also* 146–147, 199–203.
  Puerperal hemorrhage as cause of death, 68, 69, 119, 161, 163, 196–197. *See also* 199–203.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 68, 69, 196–197. *See also* 136, 199–203.
  Puerperal septicemia, 68, 69, 74, 79, 87–88, 116, **118–120**, 178, 196–197. *See also* 121, 199–203.
  Rupture of uterus, 168, 170. *See also* 76.
  Rural and urban areas, 65, 66, 83–86.
  States, 83–84, 87, 206–207.
  Technique of operator, 73–74, 87, 133, 178, 181.
  Version. *See* Version, podalic operation for delivery.
  With operation other than for delivery, 66, 76–79, 88, 177, 179.
Operation other than for delivery, 65–66, 76–78, 79, 80, 204–205.
  Abortion, deaths following, 79, 80, 107, 108, 109, 110.
  Appendectomy, 77, 78–79, 80, 88, 118, 177, 178–179, 205 (footnote).
  Blood transfusion, 76–80, 107, 118, 120–121, 160, 162–165, 177–178, 181, 204–205. *See also* 88, 98.
  Causes of death (table), 204–205.
  Cervix, packing, 76–77, 80, 107, 118, 119, 120, 204–205. *See also* 160, 164–165.
  Colored and white women, 65, 66.
  Curettage, 76–80, 88, 107–110, 114–115, 118–120, 133, 177, 178, 204–205.
  Enterostomy, 76, 77, 79, 80, 119, 177, 205 (footnote).
  Gestation period by trimester, 76-80, 118, 119, 204–205.
  Hysterectomy, 77, 78, 79, 80, 107, 118, 120, 177, 204–205.
  Incision and drainage for infection, 76, 77, 79, 80, 107, 118, 119, 120, 177, 204–205.
  Laparotomy for drainage, 77, 80, 118–119, 204–205.
  Laparotomy other than hysterectomy, 77–78, 79, 80, 107, 118–119, 120, 177.
  Packing of uterus, 76–77, 79, 80, 107, 118, 119, 120, 160, 163, 164, 165, 204–205.
  Perineorrhaphy, 15, 78, 118.
  Puerperal hemorrhage, 76, 160, 204–205.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 204–205.
  Puerperal septicemia, 76, 77, 78, 79, 80, 88, 108–110, 118–121, 133, 178–179, 204–205.
  Rural and urban areas, 65–66.
  Salpingectomy, 77, 80, 118, 119, 177, 205 (footnote).
  Trachelorrhaphy, 78, 80, 118.
  With operation for delivery, 65–66, 76, 77, 78, 79, 88, 177, 179.
Order of birth. *See* Parity.
Oregon:
  Abortion, 113, 131, 132, 208, **209–211**. *See also* 206–207.
  Accessibility of physician, 23. *See also* 25, 137.
  Attendant at confinement, 58.
  Cesarean section, 97, 206–207.
  Colored and white women, 208, 209–211.
  Ectopic gestation, 172, 174.
Oregon—Continued.
  Foreign-born and native women, 17.
  Gestation period by trimester, 31, 130, 206–207.
  Hospitalization, 21, 174.
  Live births, 17, 31, 208.
  Medical attention, 23, 25, 137. *See also* 58.
  Operations, 87, 97, **206–207**.
  "Other accidents of labor", 137.
  Prenatal care, 50, 52–53, 54.
  Puerperal albuminuria and convulsions, 54, 151.
  Puerperal hemorrhage, 158.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  Puerperal septicemia, 130, 131, 132.
  Rate, maternal mortality, 31.
  Rural and urban areas, 21, 23, **31**, 52–53, 130, 151, 158, 172, 208, 209–211.
  See also **1–2**.
Osteopath, 95. *See also* 11.
"Other accidents of labor" as cause of death, 166–171. *See also* Cesarean section as cause of death *and* "Other surgical operations and instrumental delivery" as cause of death.
  Accessibility of physician, 24.
  Cesarean section, deaths following, 89, 101.
  Classification of deaths by cause, 5–14, 89, 135, 152, 155, 166–167, 212–215.
  Colored and white women, 17, 183–185, 199–201, 202–203.
  Comment and recommendations by advisory committee, 170–171.
  Gestation period by trimester, 29, 46, 183–185, 196–197, 199–201, 202–203, 204–205.
  Intercurrent disease, 166–167.
  Interval between delivery and death, 28, 190.
  Live births and stillbirths, 34.
  Onset and termination of labor, 199–203.
  Operation for delivery, 196–197. *See also* 136, 166.
  Operation other than for delivery, 204–205.
  Parity, 191, 192–194.
  Pernicious vomiting of pregnancy, 152.
  Prenatal care, 46, 48.
  Puerperal phlegmasia alba dolens, embolus, sudden death, 135, 136, 137, 166,
  Rate, maternal mortality, 8, 29, 137.
  Rural and urban areas, 19, 183–185. *See also* 24.
  States, 137.
  Undelivered cases, 34.
  Unmarried and married women, 36.
"Other accidents of pregnancy" as cause of death. *See also* Accidents of pregnancy as cause of death.
  Abortion, deaths following, 104, 105.
  Accessibility of physician, 24.
  Age of woman, 192–194.
  Classification of deaths by cause, 5–14, 139–140, 155. *See also* 212–215.
  Colored and white women, 17, 183–185.
  Gestation period by trimester, 29, 183–185.
  Interval between termination of pregnancy and death, 190.
  Operation for delivery, 79.
  Operation other than for delivery, 204–205.
  Parity, 191, 192–194.
  Rate, maternal mortality, 8.
  Rural and urban areas, 19, 183–185.

"Other puerperal hemorrhage" as cause of death, 155, 161–163. *See also* Puerperal hemorrhage as cause of death,
  Accessibility of physician, 24.
  Cesarean section, 161, 163, 164–165, 196–197.
  Classification of deaths by cause, 5–10, 155, 161–163, 212–215.
  Colored and white women, 157, 183–185, 199–201, 202–203.
  Gestation period by trimester, 161, 183–185, 196–197, 199–203, 204–205.
  Interval between delivery and death, 28, 162, 190.
  Onset and termination of labor, 161, 199–203.
  Operation for delivery, 68, 69, 161, 196–197.
  Operation other than for delivery, 204–205.
  Parity, 191.
  Rate, maternal mortality, 157.
  Rupture of uterus, 155, 168, 169.
  Rural and urban areas, 157, 183–185.
"Other surgical operations and instrumental delivery" as cause of death. *See also* "Other accidents of labor" as cause of death.
  Accessibility of physician, 24.
  Age of woman, 192–194.
  Classification of deaths by cause, 5–10, 13, 135, 136, 166, 168, 212–215.
  Colored and white women, 17, 183–185, 199–201, 202–203.
  Gestation period by trimester, 28, 183–185, 196–197, 199–201, 202–203, 204–205.
  Interval between delivery and death, 28, 190.
  Live births and stillbirths, 33–34.
  Onset and termination of labor, 199–203.
  Operation for delivery, types, 196–197.
  Operation other than for delivery, 204–205.
  Parity, 191, 192–194.
  Rate, maternal mortality, 8, 17, 19.
  Rupture of uterus, 168.
  Rural and urban areas, 19, 183–185.
  Undelivered cases, 34.

Packing of uterus or cervix. *See* Uterus, packing.
Parity, 34–36, 191, 192–194.
  Abortion, 34–35, 111–112, 178.
  Abortion or premature labor as cause of death, 191, 192–194.
  Age of woman, 69–71, 92–94, 150, 155–156, 175, 192–194. *See also* 90–91.
  Causes of death (tables), 191, 192–194.
  Cesarean section, 69–72, 90–94, 98–102, 198–199. *See also* 154, 167.
  Cesarean section as cause of death, 191, 192–194.
  Colored and white women, 35. *See also* 49.
  Comment and recommendations by advisory committee, 64, 98–102, 154, 178.
  Eclampsia. *See* Parity—Puerperal albuminuria and convulsions.
  Ectopic gestation, 174–175, 178.
  Ectopic gestation as cause of death, 191, 192–194.
  Hours in labor, 71–72, 167–168.
  Onset and termination of labor, 75–76.
  Operation for delivery, 69–72, 76, 198–199. *See also* 154 *and* Parity—Cesarean section.
  Pelvic measurements, 76.
Parity—Continued.
  Placenta previa. *See* Parity—Puerperal hemorrhage.
  Prenatal care, 48–49, 64, 76. *See also* 43.
  Puerperal albuminuria and convulsions, 141, 149–150, 191, 192–194. *See also* 48, 154, 156.
  Puerperal hemorrhage, 155–156, 163, 191, 192–194.
  Puerperal phlegmasia alba dolens, embolus sudden death, 191, 192–194.
  Puerperal septicemia, 191, 192–194. *See also* 156.
  Rate, maternal mortality, 149–150, 156.
  Rupture of uterus, 167–169, 170.
  Unmarried and married women, 36.
Pelvic abscess, nonpuerperal cause of death, 15.
Pelvic measurements, 43, 45, 76, 89–90, 98–99.
Pelvic puncture. *See* Incision and drainage for infection.
Pelvis, contracted, indication for Cesarean section, 89–92, 96, 97, 98–102.
Perineorrhaphy, 15, 78, 118.
Peritonitis, laparotomy for drainage, 77, 80, 118–119, 204–205.
Peritonitis, puerperal, classification in international list, 5, 6.
Pernicious vomiting of pregnancy, 151–153.
  Classification, 5, 7, 139, 142, 152, 212–215.
  Therapeutic abortion, 79, 108, 114, 153.
Phlebitis, 135, 136, 138.
Phlegmasia. *See* Puerperal phlegmasia alba dolens, embolus, sudden death.
Physician. *See* Medical attention.
Pituitrin, 62–63, 76, 162, 168, 169.
  Comment and recommendations by advisory committee, 64, 165, 170–171, 181.
Placenta, manual removal, 67–70, 72, 73, 120, 161, 169, 196–197, 198, 206–207. *See also* 65, 88.
Placenta, premature separation, 163, 165.
  Cesarean section, 90–92, 94, 96, 97, 102, 163.
  Classification of deaths by cause, 155, 161, 163.
  Therapeutic abortion, 79, 108.
Placenta previa, 158–161, 163–165. *See also* Placenta previa as cause of death.
  Accessibility of physician, 159–160, 164.
  Blood transfusion, 98, 160, 164–165.
  Cesarean section, 90–92, 94, 96–98, 102, 160, 164–165.
  Classification of deaths by cause, 155, 158, 212–215.
  Comment and recommendations by advisory committee, 87, 98, 102, 163–165.
  Hemorrhage as warning of, 159, 163–164.
  Operation for delivery, 79, 108, 160, 164–165. *See also* 119 *and* Placenta previa—Cesarean section.
  Postpartum hemorrhage, 160–161, 164.
  Puerperal septicemia, 116, 158, 164–165. *See also* 119, 155.
  Therapeutic abortion, 79, 108.
Placenta previa as cause of death, 158. *See also* Placenta previa *and* Puerperal hemorrhage as cause of death.
  Abortion, 104–105.
  Accessibility of physician, 24.
  Age of woman, 192–194.
  Classification of deaths by cause, 5–10, 155, 158. 212–215. *See also* 103.

- Placenta previa as cause of death—Continued.
  - Colored and white women, 157, 183–185, 199–201, 202–203.
  - Gestation period by trimester, 183–185, 196–197, 199–201, 202–203, 204–205.
  - Interval between delivery and death, 28, 161, 190.
  - Onset and termination of labor, 199–203.
  - Operation for delivery, 68, 69, 196–197.
  - Operation other than for delivery, 204–205.
  - Parity, 191.
  - Rate, maternal mortality, 157.
  - Rural and urban areas, 157, 183–185.
- Plastic operation on perineum, 15, 78, 118.
- Plural pregnancy, 32–34, 50.
- Pneumonia, 15, 89, 90, **101**, 102, 166, 167.
- Podalic version and extraction. *See* Version, podalic, operation for delivery.
- Porro Cesarean section, 77, 101. *See also* Cesarean section.
- Postabortive sepsis, classification in international list, 5, 212–215.
- Postmortem delivery, puerperal albuminuria and convulsions, 148.
- Postpartum care, 40, 41, 63, 123, 162, 180–182.
- Postpartum hemorrhage, 116, 155, 160, **162**, 164.
- Postpartum hemorrhage as cause of death, 5, 155, 161, 162, 169.
- Postpartum sepsis, classification in international list, 5.
- Postpuerperal shock, classification in international list, 5.
- Precedence, rules of. *See* Classification of deaths by cause.
- Preeclampsia, 89–92, 94, 96, 97, 98–102, 154. *See also* Puerperal albuminuria and convulsions.
- Pregnancy, abdominal, 69, 77, 78, 178. *See also* Ectopic gestation.
- Pregnancy, accidents of. *See* Accidents of pregnancy as cause of death.
- Pregnancy, care during. *See* Prenatal care.
- Pregnancy, cornual, 5, 172, 212, 213.
- Pregnancy, duration. *See* Gestation period by month *and* Gestation period by trimester.
- Pregnancy, ectopic, extrauterine, or tubal. *See* Ectopic gestation.
- Pregnancy, plural, 32–34, 50.
- Pregnancy (unqualified) as cause of death, classification in international list, 5, 6, 212.
- Premature labor. *See* Abortion or premature labor as cause of death.
- Premature separation of placenta, 163, 165.
  - Cesarean section, 90–92, 94, 96, 97, 102, 163.
  - Classification of deaths by cause, 155, 161, 163.
  - Therapeutic abortion, 79, 108.
- Prenatal care, 40–55.
  - Abortion, 47, 143. *See also* 41.
  - Blood-pressure examination, 43, 45.
  - Causes of death (table), 46.
  - Colored and white women, 37, **41–42**, 44, 45, 49, **50–51**, 64, 142, 195.
  - Comment and recommendations by advisory committee, 38–39, 63–64, 87, 102, 153–154, 180–182.
  - Gestation period by trimester, 45–48, 142.
  - Grades, 41–55, 142–143, 195.
  - Live births and stillbirths, 49–50, 64.
  - Operation for delivery, 76, 87.
- Prenatal care—Continued.
  - Parity, 48–49, 64, 76. *See also* 43.
  - Pelvic measurements, 43, 45, 76.
  - Puerperal albuminuria and convulsions, 46, 47–48, **54–55**, 64, 142–143, 151, 153–154.
  - Puerperal hemorrhage, 46, 47–48. *See also* 39.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 46, 48.
  - Puerperal septicemia, 46, 47.
  - Rate, maternal mortality, correlation with prenatal care, 53–55. *See also* 151.
  - Rural and urban areas, 37, 38–39, 41–45, 50, **52–53**, 64, 195.
  - Standards, 43. *See also* 1.
  - States, 51–53, 54.
  - Termination of labor, 76.
  - Unmarried women, 37–38, 195.
  - Wassermann test, 43, 44-45.
- Presentation, abnormal, *See* abnormal presentation.
- Presentation, breech, 90, 91, 168. *See also* Breech extraction.
- Previable fetus. *See* Viability of fetus.
- Primiparae. *See* Parity.
- Puerperal albuminuria and convulsions, 139–151. *See also* Toxemias of pregnancy *and* Eclampsia.
  - Abortion, 103, 104, 105, 143. *See also* 79, 196–197.
  - Accessibility of physician, 23–24, 39.
  - Age of woman, 150, 192–194.
  - Autopsy, 14–15.
  - Cesarean section, 89, 94, 95, 99, 101, 146, **148**, 154.
  - Chronic nephritis, 5, 139, 141, 142.
  - Classification of deaths by cause, 5–10, 13, 139–141. *See also* 79, 89, 103–105, 135, 152, 212–215.
  - Colored and white women, **16**, 17, 18, 59–60, **140–142**, **144–147**, **150–151**, 183–185, 199–201, 202–203.
  - Comment and recommendations by advisory committee, 64, 100, **153–154**.
  - Delivery before or after death, 147, 148, 149.
  - Gestation period by trimester, 28–29, 142, 146–147, **183–185**, 196–197, 199–205.
  - Hospitalization, 145–146.
  - Interval between delivery and death, 28, 149, 190.
  - Kidney disease, previous, 149.
  - Labor, onset and termination, 146–147, 199–203.
  - Live births and stillbirths, 33–34, 148, 149. *See also* 96.
  - Medical attention, when received, 23, 24, 39, **141–146**.
  - Operation for delivery, 68–69, **148**, 196–197. *See also* 119 *and* Cesarean section.
  - Operation other than for delivery, 204–205.
  - Parity, 141, 149–150, 191, 192–194. *See also* 48, 154, 156.
  - Pernicious vomiting of pregnancy, 142, 151–152.
  - Prenatal care, 46, 47–48, **54–55**, 64, **142**, **143**, 151, 154.
  - Puerperal septicemia, 28, 116, 119, 140–141.
  - Rate, maternal mortality, 8, 17, 18, 29, 54–55, 150, 151.
  - Rupture of uterus, 139, 141, 167, 168.
  - Rural and urban areas, 18, 19, 23–24, 28, 140, 141, 144–147, **150–151**, 183–185.
  - Undelivered cases, 34, 147, 148–149.
  - Unmarried and married women, 36.
  - States, 54, 150, 151.
  - *See also* 40.

- Puerperal death, definition, 5.
- Puerperal diseases of the breast as cause of death, 5–10, 13, 17, 19, 24, 29, 34, 36, 46, 183–185, 190, 191, 192–194, 213–214.
- Puerperal eclampsia, classification in international list, 5. *See also* Eclampsia.
- Puerperal hemorrhage as cause of death, 155–165. *See also* Hemorrhage, Placenta previa as cause of death, *and* "Other puerperal hemorrhage" as cause of death.
  - Abortion, 104, 105, 155.
  - Accessibility of physician, 23–24.
  - Age of woman, 155–156, 163, 192–194.
  - Cesarean section, 89, 94, 101.
  - Classification of deaths by cause, 5–10, 13, 155, 212–215. *See also* 105, 116, 139, 141, 149 (footnote).
  - Colored and white women, 17, 18, 157–158, 183–185, 199–203.
  - Gestation period by trimester, 18, 29, 46, 183–185, 196–197, 199–203.
  - Interval between delivery and death, 27–28, 190.
  - Live births and stillbirths, 33–34.
  - Onset and termination of labor, 199–203.
  - Operation for delivery, 68, 69, 119, 196–197. *See also* Cesarean section.
  - Operation other than for delivery, 76, 204–205.
  - Parity, 155–156, 163, 191, 192–194.
  - Pituitrin, 62, 64.
  - Premature separation of placenta, 163, 165.
  - Prenatal care, 39, 46, 48.
  - Rate, maternal mortality, 8, 156, 157–158.
  - Rupture of uterus, 167, 168.
  - Rural and urban areas, 18, 19, 157–158, 183-185. *See also* 23–24.
  - States, 157–158.
  - Undelivered cases, 34.
  - Unmarried and married women, 36.
- Puerperal insanity, classification in international list, 5.
- Puerperal peritonitis or abscess, classification in international list, 5, 6.
- Puerperal phlegmasia alba dolens, embolus, sudden death, 135–138.
  - Abortion, 104, 105, 136. *See also* 103.
  - Accessibility of physician, 24.
  - Age of woman, 192–194.
  - Autopsy, 14, 135, 136.
  - Cesarean section, 89, 101. *See also* 136.
  - Classification of deaths by cause, 5–10, 13, 135. *See also* 40, 89, 103, 139–140, 141, 152, 168, 212–215.
  - Colored and white women, 16–18, 138, 183–185, 199–201, 202-203.
  - Comment and recommendations by advisory committee, 138.
  - Gestation period by trimester, 29, 46, 104, 136, 183–185, 196–197, 199–201, 202–203, 204–205.
  - Interval between delivery or abortion and death, 28, 137, 190.
  - Inversion of uterus, 169.
  - Live births and stillbirths, 34.
  - Onset and termination of labor, 199-203.
  - Operation for delivery, 68, 69, 136, 196–197. *See also* 135, 136, 166, *and* Cesarean section.
  - Operation other than for delivery, 204–205.
  - "Other accidents of labor" as cause of death, 137. *See also* 166.
- Puerperal phlegmasia alba dolens, embolus, sudden death—Continued.
  - Parity, 191, 192–194.
  - Pernicious vomiting of pregnancy, 152.
  - Prenatal care, 46, 48.
  - Puerperal albuminuria and convulsions, 141.
  - Rate, maternal mortality, 8, 18, 29, 137–138.
  - Rupture of uterus, 135, 136, 138, 168.
  - Rural and urban areas, 18, 19, 138, 183–185. *See also* 24.
  - States, 137.
  - Undelivered cases, 34.
  - Unmarried and married women, 36.
- Puerperal septicemia, 116–134.
  - Abortion, 23, 47, 79, 103, **104**, **105–106**, 108–110, 114, 116, 117, 118, **131–132**, 133, 212–215. *See also* 115, 129, 153, 178.
  - Accessibility of physician, 23, 24.
  - Age of woman, 192–194.
  - Attendant at confinement, 60–61, 122–128, 133.
  - Autopsy, 14–15.
  - Cesarean section, 94, 95, 98–102, 196–197. *See also* 89, 116, 117, 120.
  - Classification of deaths by cause, 5–10, 116–117. *See also* 13, 103, 135, 139, 140, 141, 155, 212–215.
  - Colored and white women, 17, 18, 124–125, **129–131**, 183–185, 199–201, 202–203.
  - Comment and recommendations by advisory committee, 133–134. *See also* 39, 64, 87, 88, 99–102, 114–115, 164–165, 178–179.
  - Curettage, 78, 88, **108–110**, **114–115**, 118, 120, 133, 204–205.
  - Delivery care, 60–61, 62, 123–128, 133–134.
  - Ectopic gestation, 88, 116, 117, 118, 172, 178, 179. *See also* 129.
  - Gestation period by trimester, 28–29, 116, 117, 129–131, 183–185, 196–197, 199–203, 204–205.
  - Hemorrhage, 108, 110, 123. *See also* Puerperal hemorrhage.
  - Hospitalization, 123, 127–128, 133.
  - Live births and stillbirths, 34. *See also* 122.
  - Midwives, 122–129, 133. *See also* 98.
  - Nursing care, 123.
  - Onset and termination of labor, 121, 133, 199–203.
  - Operation for delivery, 68, 69, 74, 79, 87–88, 116, 117, **118–120**, 178, 196–197. *See also* Puerperal septicemia—Onset and termination of labor *and* Cesarian section.
  - Operation other than for delivery, 76, 77, 78, 79, 80, 88, 108–110, 118–121, 133, 178–179, 204–205.
  - Parity, 191, 192–194. *See also* 156.
  - Pernicious vomiting of pregnancy, 152, 153.
  - Pituitrin, 62, 64.
  - Placenta previa, 116, 158, 164–165. *See also* 119, 155, *and* Puerperal septicemia—Puerperal hemorrhage.
  - Prenatal care, 46, 47.
  - Puerperal albuminuria and convulsions, 28, 116, 119, 140–141.
  - Puerperal hemorrhage, 116, 156, 158, 163, 164, 165.
  - Rate, maternal mortality, 8, 18, 19, 29, 129, 130, 131, 132.
  - Rupture of uterus, 167–168.
  - Rural and urban areas, 18, 19, 28, 129–131, 183–185.
  - States, 129–132.

- Puerperal septicemia—Continued.
  - Technique of physician, 60–62, 74, 88, 95, 123–127, 133–134.
  - Undelivered cases, 34, 121.
  - Unmarried and married women, 36, 39.
  - Vaginal examination, 95, 126–127.
- Pulmonary embolism, 135–136. *See also* Puerperal phlegmasia alba dolens, embolus, sudden death.
- Pyelitis or pyelonephritis, 5, 122, 139. *See also* 91.

- **Race,** *See* Colored and white women.
- Rate, maternal mortality, 3, 8.
  - Abortion, 112, 131–132, 208.
  - Abortion or premature labor as cause of death, 8, 17, 19.
  - Age of woman, 35–36.
  - By cause of death, 8, 17, 18, 19, 29.
  - Cesarean section as cause of death, 8, 17, 19.
  - Colored and white women, **16–18, 30, 35–36**, 38, 112, 129, 131, 138, 150, 157, 158, 173, 208. *See also* 28, 38.
  - Comment and recommendations by advisory committee, 38–39, 64, 181.
  - Ectopic gestation, 172–174.
  - Ectopic gestation as cause of death, 8, 17, 19.
  - Foreign-born and native women, 16–17.
  - Gestation period by trimester, 18, 29, 30–31, 129–131.
  - Medical care, when received, correlation with maternal mortality rate, 137.
  - Parity, 149–150, 156.
  - Prenatal care, grade, correlation with maternal mortality rate, 53–55. *See also* 48.
  - Puerperal albuminuria and convulsions, 8, 17, 18, 19, 29, 54–55, 150–151.
  - Puerperal hemorrhage, 8, 17, 18, 19, 29, 157–158.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 8, 17, 18, 19, 29, 137–138.
  - Puerperal septicemia, 8, 18, 19, 29, 129–132.
  - Rural and urban areas, 18, 19, 20, 31, 38, 112, 129, 130, 138, 151, 157, 158, 172, 173, 208. *See also* 28.
  - States, 3, 16–17, 30, 31, 54–55, 130–131, 132, 137, 150, 157–158, 172, 173, 208. *See also* 28.
  - Unmarried and married women, 37–38, 39.
- Reclassification of deaths, 5–10. *See also* 212–215, *and specific causes of death.*
- Recommendations by advisory committee. *See* Comment and recommendations by advisory committee.
- Rectal examination, 62, 64, 95, 127, 133.
- Repair of lacerated uterus, puerperal septicemia, 119.
- Residence, 20–21. *See also* Rural and urban areas.
- Respiratory diseases as contributory causes, 167.
- Respiratory distress associated with embolus, 136.
- **Rhode Island:**
  - Abortion, 113, 131, 132, **208, 209–211**. *See also* 206–207.
  - Attendant at confinement, 58.
  - Cesarean section, 97, 206–207.
  - Colored and white women, 208, 209–211.
  - Ectopic gestation, 172, 174.
  - Foreign-born and native women, 17.
  - Gestation period by trimester, **31**, 130, 206–207.
  - Hospitalization, 21, 174.
  - Live births, 17, 31, 208.
- **Rhode Island**—Continued.
  - Medical attention, 25, 137. *See also* 58.
  - Operations, 87, 97, **206–207**.
  - "Other accidents of labor", 137.
  - Prenatal care, 50, 52–53, 54.
  - Puerperal albuminuria and convulsions, 54, 151.
  - Puerperal hemorrhage, 157, 158.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
  - Puerperal septicemia, 130, 131, 132.
  - Rate, maternal mortality, 30, 31.
  - Rural and urban areas, 19, 21, 31, 52–53, 130, 151, 157, 158, 172, 208, 209–211.
  - *See also* 1–2.
- Roads, bad. *See* Accessibility of physician.
- Rubber gloves, use for vaginal examination, 60, 61, 64, 126–127, 133, 181.
- Rupture of bladder, classification in international list, 5, 166.
- Rupture of uterus. *See* Uterus, rupture.
- Ruptured ectopic gestation. *See* Ectopic gestation.
- Ruptured membranes, 94, 99, 101, 122, 164.
- Rural and urban areas, 2, **19–24**, 31, **183–185**.
  - Abortion, 19, 23, 38, **112**, 129, **208, 209–211**.
  - Abortion or premature labor as cause of death, 19, 183–185.
  - Accessibility of physician, 11, 22–25, 39.
  - Accidents of pregnancy as cause of death, 183–185.
  - Causes of death (tables), 19, 183–185.
  - Cesarean section, 83–86, 91–92, 98.
  - Cesarean section as cause of death, 19, 183–185.
  - Classification of rural and urban areas, 2 (footnote). *See also* 14, 19.
  - Colored and white women, 28, 42, 44, 45, 64, 66, 84–86, 98, 129, 138, 140–141, 144, 145, 157, 183–185, 209–211.
  - Comment and recommendations by advisory committee, 38–39. *See also* 178.
  - Ectopic gestation, 83, 172–173, 178.
  - Ectopic gestation as cause of death, 19, 183–185. *See also* 24.
  - Gestation period by trimester, 18, 28–31, 84–86, 129, 130, 146, 147, 183–185.
  - Hospitalization, 20, 21, 27, 38, 173, 174.
  - Live births in States included in study, 19, 31, 208.
  - Medical attention, when received, 11–12, 22–25, 39, 144–145, 174. *See also* Rural and urban areas—Prenatal care.
  - Operation for delivery, 65, 66, 83–86. *See also* Cesarean section.
  - "Other accidents of labor" as cause of death, 19, 183–185.
  - Prenatal care, 37, 38, 39, **41–45**, 50, **52–53**, 64, 195.
  - Puerperal albuminuria and convulsions, 18, 19, 28, 140–141, 144, 145, 146, 147, **151**, 183–185. *See also* 23–24.
  - Puerperal hemorrhage, 18, 19, 157–158, 183–185. *See also* 23–24.
  - Puerperal phlegmasia alba dolens, embolus, sudden death, 18, 19, 138, 183–185. *See also* 23–24.
  - Puerperal septicemia, 18, 19, 28, 129–131, 183–185. *See also* 23–24.
  - Rate, maternal mortality, 18, 19, 31, 112, 208. *See also* 20, 38, *and specific causes of death.*

Rural and urban areas—Continued.
  States, 31, 208.
  Unmarried and married women, 37, 38, 195.
  Wassermann test, 44–45.

Salpingectomy, 77, 80, 118, 119, 177, 205 (footnote).
Salpingitis, 15.
Salpingo-oophorectomy, 77, 80. *See also* Salpingectomy.
Schedule used in study, 1–4, facing 216. *See also* 14.
Self-induced abortion, 41, 103–104, 114. *See also* Abortion—Induced.
Sepsis. *See* Puerperal septicemia.
Shaving, scrubbing in delivery technique, 60, 127.
Shock:
  Cesarean section, 89, 94, **101–102**, 154, 164–165.
  Comment and recommendations by advisory committee, 101–102, 154, 164–165, 181.
  Difficult labor, 166.
  Eclampsia, 94, 154.
  Inversion of uterus, 166, 169.
  Operation for delivery, 79, 80, 166. *See also* Shock—Cesarean section.
  Operation other than for delivery, 79, 80.
  Placenta previa, 94, 164–165.
  Premature separation of placenta, 94, 165.
Shock, postpuerperal, classification in international list, 5, 166.
Smallpox, 6.
Spinal anesthesia, 96–97, 101, 102.
Spontaneous abortion. *See* Abortion—Spontaneous.
Spontaneous delivery or termination of labor. *See* Labor, onset and termination.
Standards, hospital, 27, 182, 186, 188, 189.
Standards of Prenatal Care (United States Children's Bureau Publication No. 153), 1, 43.
State board or department of health, 1–3. *See also* 7, 57, 58, 139, 180, 181.
States included in study, xiv, 1–2. *See also names of States.*
Sterilization of drapes and instruments. *See* Technique of physician (asepsis.)
Sterilization of woman, Cesarean section, 91, 99.
Stillbirths, 3 (footnote), 32–34, 39.
  Cesarean section, 96, 98, 99, 100.
  Classified by cause of mother's death, 33, 34.
  Colored and white women, 32–33.
  Comment and recommendations by advisory committee, 39, 64,
  Definition, 3 (footnote), 32.
  Operation for delivery, 73. *See also* Stillbirths—Cesarean section.
  Pituitrin, 62, 64.
  Prenatal care, 49, 50, 64.
  Puerperal albuminuria and convulsions, 33, 34, 149. *See also* 96.
  Puerperal hemorrhage, 33, 34, 164. *See also* 96.
Students, medical. *See* Attendant at confinement.
Sudden death. *See* Puerperal phlegmasia alba dolens, embolus, sudden death.
Surgeons, American College of, 1, 182, 186–189.
Syphilis, 6, 45.

Technique, hospital, 188, 189.
Technique of physician (asepsis), 56, 60–62, 73–74, 95, 122–128, 178. *See also* 41.
Technique of physician—Continued.
  Comment and recommendations by advisory committee, 64, 87, 101, 114, 133, 164–165, 178, 181.
Temperature, fever. *See* Fever.
Temperature, taking, in prenatal care, 43.
Termination of labor. *See* Labor, onset and termination.
Tetanus, puerperal, classification in international list, 5, 212.
Therapeutic abortion, 78, 79, 83–86, 89, **105–114**, 117, 118, 132, 136, 153, 196–197, 206–207, 209–211. *See also* 88, 127, 143.
Thoracotomy, 78.
Thrombosis, 135, 136, 138.
Toxemias of pregnancy, 139–154. *See also* 5–10, 39, 40–41, 79, 99, 101, 102, 108, 116, 163, 181, 212–215, Eclampsia, Pernicious vomiting of pregnancy, *and* Puerperal albuminuria and convulsions.
Trachelorrhaphy, 78, 80, 118.
Tracheotomy, 78.
Transfusion, *See* Blood transfusion.
Transportation. *See* Accessibility of physician.
Trimester of pregnancy. *See* Gestation period by trimester.
Triplets. *See* Plural pregnancy.
Tubal pregnancy. *See* Ectopic gestation.
Tubal pregnancy, infected, classified in international list, 5.
Tuberculosis, 6, 15.
Tumor. *See* Fibroid tumor.
Twins. *See* Plural pregnancy.
Typhoid fever, 6.

Uncomplicated cases, 40.
Undelivered cases, 32–34, 49–50, 62, 67–69, 74–75, 79, 80–83, 103 (footnote), 121, 146–149, 161, 163, 168, 199–203. *See also* 39.
United States birth-registration area, 1, 2, 3, 6, 32, 38.
United States Bureau of the Census. *See* Census, United States Bureau of.
United States Children's Bureau, plan for study of maternal mortality, 1–4. *See also* 43.
Unmarried women, 36–38, 39, 108, 114, 195.
Uremia. *See also* Toxemias of pregnancy.
  Classification in international list, 5, 139.
  Indication for Cesarean section, 90, 92, 96, 97, 102. *See also* 178.
Urinalysis, 43, 45. *See also* 3, 141.
Uterus, bicornuate, as indication for Cesarean section, 91.
Uterus, fibroid:
  Cesarean section, 90–91.
  Hysterectomy, 78, 177.
  Rupture of uterus, 170.
Uterus, inversion, 5, 76, 77, 166, **169**, **171**. *See also* 205.
Uterus, laceration. *See* Laceration of cervix or perineum *and* Uterus, rupture.
Uterus, packing, 76–77, 79, 80, 107, 204–205.
  Puerperal hemorrhage, 160, 163, 164, 165.
  Puerperal septicemia, 118–119, 120, 164, 165.
Uterus, punctured, hysterectomy for, 80.
Uterus, removal. *See* Hysterectomy.
Uterus, rupture, 167–171, 181. *See also* Uterus, rupture, as cause of death.

Uterus, rupture—Continued.
Cesarean section, indication for, 90–92, 96, 97, 102, 167–168, 170.
Cesarean section, previous, 90, 167, 170.
Classification of deaths, by cause, 5, 166. *See also* 103, 155.
Comment and recommendations by advisory committee, 64, 138, 164, 170–171, 181. *See also* 102.
Hysterectomy for, 77.
Operation for delivery, 76, 168.
Pituitrin, 64, 76, 168, 170.
Placenta previa, 160, 164.
Puerperal albuminuria and convulsions, 139, 141, 168.
Puerperal hemorrhage, 155, 160, 164, 167, 168.
Puerperal phlegmasia alba dolens, embolus, sudden death, 135, 136, 138, 168.
Puerperal septicemia, 167.
Undiagnosed, 168–169, 170.
Uterus, rupture, as cause of death, 5, 166, 167, 212–215. *See also* Uterus, rupture.

Vaginal examination, 61, 62, 95, 126–128.
Comment and recommendations by advisory committee, 64, 101, 133, 164, 181.
See also 25, 73.
Version, Braxton Hicks, 160, 164.
Version during labor, classification in international list, 5.
Version, podalic, operation for delivery, 67–73.
Age of woman, 69–71.
Before last trimester, 78.
Classification of deaths by cause, 68, 69, 196–197.
Colored and white women, 83, 84–86.
Comment and recommendations by advisory committee, 87, 88, 164, 170.
Dilatation of cervix, artificial, 67, 68, 69, 73, 78, 88, 120, 148, 160, 163, 168, 169, 196–197, 198, 206–207.
Duration of labor, 71, 72.
Forceps, 67, 68, 69, 73, 88, 120, 168, 169, 196–197, 198, 206–207.
Live births and stillbirths, 73.
Manual removal of placenta, 67, 68, 161, 196–197, 198, 206–207.
Parity, 69, 70, 71, 72, 198.
Placenta previa, 68, 160, 164, 196–197.
Premature separation of placenta, 163.
Puerperal albuminuria and convulsions, 68, 69, 148, 196–197.
Puerperal hemorrhage, 68, 69, 160, 161, 164, 196–197.
Puerperal septicemia, 68, 69, 87, 120, 196–197.
Rupture of uterus, 168.
Rural and urban areas, 83–86.
States, 206–207.
Technique of physician, 73, 87.
Viability of fetus, 28, 32, 39, 104, 178. *See also* Live births *and* Stillbirths.
Virginia:
Abortion, 113, 131–132, 208, 209–211. *See also* 206–207.
Accessibility of physician, 23. *See also* 25, 137.
Attendant at confinement, 57, 58, 59.
Cesarean section, 97, 206–207.

Virginia—Continued.
Colored and white women, 16, 30, 51, 131, 150, 158, 173, 208, 209–211.
Ectopic gestation, 172, 173, 174.
Gestation period by trimester, 30, 31, 130, 131, 206–207.
Hospitalization, 21, 174.
Live births, 30, 31, 208.
Medical attention, 23, 25, 137. *See also* 57, 58, 59.
Midwives, 57, 58, 59.
Operations, 87, 97, 206–207.
"Other accidents of labor", 137.
Prenatal care, 50, 51, 52–53, 54.
Puerperal albuminuria and convulsions, 54, 150, 151.
Puerperal hemorrhage, 158.
Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
Puerperal septicemia, 130, 131, 132.
Rate, maternal mortality, 30, 31.
Rural and urban areas, 21, 23, 31, 52–53, 130, 151, 158, 172, 208, 209–211.
See also 1–2.
Vital statistics. *See* State board or department of health *and* Census, United States Bureau of.
Vomiting. *See* Pernicious vomiting of pregnancy.

Washington:
Abortion, 113, 130, 132, 206–207, 208, 209–211.
Accessibility of physician, 23. *See also* 25, 137.
Attendant at confinement, 58.
Cesarean section, 97, 206–207.
Colored and white women, 208, 209–211.
Ectopic gestation, 172, 174.
Foreign-born and native women, 17.
Gestation period by trimester, 28, 31, 130, 206–207.
Hospitalization, 21, 27, 174.
Live births, 17, 31, 208.
Medical attention, 23, 25, 137. *See also* 58.
Midwives, 58.
Operations, 87, 97, 206–207.
"Other accidents of labor", 137.
Prenatal care, 50, 52–53, 54.
Puerperal albuminuria and convulsions, 54, 151.
Puerperal hemorrhage, 158.
Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
Puerperal septicemia, 130, 131, 132.
Rate, maternal mortality, 31.
Rural and urban areas, 19, 21, 23, 31, 52–53, 130, 151, 158, 172, 208, 209–211. *See also* 28.
See also 1–2.
Wassermann test, 43, 44, 45.
White women. *See* Colored and white women.

Wisconsin:
Abortion, 113, 131–132, 208, 209–211. *See also* 206–207.
Accessibility of physician, 23. *See also* 25, 137.
Attendant at confinement, 57, 58.
Cesarean section, 97, 206–207.
Colored and white women, 208, 209–211.
Ectopic gestation, 172, 174.

Wisconsin—Continued.
- Foreign-born and native women, 17.
- Gestation period by trimester, **31**, 130, 206–207.
- Hospitalization, 21, 174.
- Live births, 17, 31, 208.
- Medical attention, 23, 25, 137. *See also* 57, 58.
- Midwives, 57, 58.
- Operations, 84, 87, 97, **206–207.**
- "Other accidents of labor", 137.
- Prenatal care, 52–53, 54.

Wisconsin—Continued.
- Puerperal albuminuria and convulsions, 54, 151.
- Puerperal hemorrhage, 158.
- Puerperal phlegmasia alba dolens, embolus, sudden death, 137.
- Puerperal septicemia, 130, 131, 132.
- Rate, maternal mortality, 31.
- Rural and urban areas, 21, 23, **31**, 52–53, 130, 151, 158, 172, 208, 209–211.
- *See also* 1–2.